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MALTING QUALITY OF BARLEY VARIETIES AND SELECTIONS  
GROWN IN THE MISSISSIPPI VALLEY UNIFORM NURSERY AND  
AT CENTRAL AND EASTERN STATIONS IN 2000

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This is a joint progress report of cooperative investigations being conducted in the Agricultural Research Service of the U.S. Department of Agriculture and State Agricultural Experiment Stations. It contains preliminary data that have not been sufficiently confirmed to justify general release; interpretations may be modified with additional experimentation. Confirmed results will be published through established channels. The report is primarily a tool available to cooperators and their official staffs and for those persons who have direct and special interest in the development of improved malting barleys.

This report includes data furnished by the Agricultural Research Service as well as by the State Agricultural Experiment Stations. The report is not intended for publication and should not be referred to in literature citations nor quoted in publicity or advertising. Use of the data may be granted for certain purposes upon written request to the agency or agencies involved.

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Samples malted and analyzed by the Cereal Crops Research Unit, Madison WI

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Appendix A

Table A1

# **MALTING QUALITY OF BARLEY VARIETIES AND SELECTIONS GROWN AT CENTRAL AND EASTERN STATIONS IN 2000**

## **Introduction**

At the Cereal Crops Research Unit, we malt barleys received from public sector breeders and evaluate each line for its commercial malting quality. We malt and analyze each submission as consistently as possible, which allows us to compare the lines with each other. Our objective is to provide accurate data and evaluations of new selections and to facilitate the development of improved malting barleys.

## **Materials**

The 1766 samples upon which this report is based came from several locations; either as a part of the Mississippi Valley Uniform Barley Nursery or as experimental selections from several research programs. Individual breeders' experimental lines from stations in Maine, Minnesota and North Dakota were processed and evaluated.

## **Methods**

Most of our analyses were performed according to the Methods of Analysis of the ASBC, 8<sup>th</sup> edition, 1992. Details of the analyses are listed in Appendix A.

We replaced our LECO FP-428 with a current FP-528 Nitrogen analyzer. The analytical chemistry used in both instruments is the same, and our collaborative results have agreed with those from other laboratories. All other instrumentation has remained the same as in the previous year.

## **Rankings and Quality Scores**

The best performing entries in each table can be found by consulting the Overall Rank Value column. The rank values were determined by the quality scores that were generated for each submission, with the rank order proceeding from low (best) to high (poorest). The quality scores were computed for each line on the basis of the sum of its individually scored parameters. Numbers are assigned to each of the malt quality traits, and their magnitudes are related to how closely the trait values conform to what industry wants them to be. The closer the analytical data are to the ideal, the more points are awarded. The most important quality traits (extract, soluble protein, etc.) are awarded

more points than those of lesser importance. This gives a relative assessment of the overall performance of each line. The criteria used to generate the quality scores have been listed in Table A1.

## **Mississippi Valley Uniform Barley Nursery - 2000**

Nursery samples were received for malting quality evaluation from four experimental stations located in three states. Twelve of 28 entries (#19 - #30) were new in this year's nursery (Table 1).

These samples were germinated for 5 days and intermittently turned for 3 minutes each half hour, which should have yielded malts having modification levels that are similar to those produced by industry. The malting conditions and analytical methods employed are presented in Appendix A. The criteria and value assignments used to calculate quality scores are listed in the same Appendix (Table A1).

Mean values of 11 quality factors are listed over the three stations located in the Mississippi Valley area (Table 2) and over all varieties (Table 3). Tables 8 and 9 report the same factors, but also include data from samples that were grown in Aberdeen, Idaho. Individual station data are reported in Tables 4 through 7. The parentages of the nursery entries are listed in Table 1. Evaluations of data from individual locations and overall performance evaluations, derived primarily from Tables 2, 3, 8 and 9, are presented below.

Half of the plump barleys from Morris, MN (Table 4) had unacceptably high protein contents. A third of the extract values fell below the desired limit, and half of the soluble protein levels were too high. The S/T ratios ranged from four submissions that were too low, to seven that were too high. The diastatic power values varied considerably, with three that were below the desired limits and nine that exceeded them. The  $\beta$ -glucan levels ranged from very good to four that exceeded the upper limit, while nearly all of the  $\alpha$ -amylase values were too high. The best performers were M107, Drummond, and Lacey, all of which performed quite nicely, except for their elevated  $\alpha$ -amylase levels.

All but five of the plump barleys from Bottineau, ND (Table 5) had acceptable protein contents and the extract values were generally good, averaging 79.3 %. The soluble protein levels ranged from very good to a third that exceeded the upper limit. Most of the diastatic power values were good, but nearly all of the  $\alpha$ -amylase values were too high. The  $\beta$ -glucan levels ranged from a couple submissions that had low values, to six that exceeded the upper limit. The best performers were BT462, 2ND16461, BT478 and Drummond.

A quarter of the thin barleys from Fargo, ND (Table 6) had unacceptably high protein contents. Over two thirds of the extract values were unacceptably low and, with some exceptions, their soluble protein levels were a bit high. The diastatic power levels ranged from two that were too low to a dozen that exceeded the upper limit, while all of the  $\alpha$ -amylase levels except that of Robust

were unacceptably high. The  $\beta$ -glucan levels ranged from good to a bit high, except for that of Barbless, which was extremely high. None of the submissions performed very well at this location.

A third of the very plump barleys from Aberdeen, ID (Table 7) had unacceptably high protein contents. The extract and soluble protein values were generally quite good, averaging 80 and 5.0% respectively. Two thirds of the S/T ratios were below the desired limit and over half of the  $\beta$ -glucan levels were too high. Half of the diastatic power and two thirds of the  $\alpha$ -amylase values were too high. The best performers were M103, Foster, M108, Robust, 6B96-3733, M106 and Colter.

Overall, the barleys grown at Aberdeen (Tables 8 and 9) performed best. They were generally plumper, yielded higher extract values and had lower soluble protein levels than the submissions from the other locations. Of the lines grown within the Mississippi Valley (Tables 2 and 3) those from Bottineau performed best, exhibiting very good extract and diastatic power values. The lines grown at Fargo were extremely thin and this most likely contributed to their poor performance.

In general, the samples in this year's nursery had elevated  $\alpha$ -amylase and soluble protein levels (Tables 3 and 9). The selections grown at Fargo were exceptionally thin, which brought nearly all of their average plumpness values down to an unacceptable level. Two thirds of the first and second year submissions had higher malt quality scores than that of Morex. The selections Drummond and Lacey showed excellent malting quality, except for their elevated  $\alpha$ -amylase levels. M108, 6B94-8253, ND16301, 2ND16461, 6B96-3733, BT462 and M107 all had good quality scores. However, in addition to the high  $\alpha$ -amylase levels, each of these lines was deficient in at least one other malt quality parameter.

## 2000 Crop Year Evaluations

### Submissions from Maine

2000 Malting Barleys, Nitrogen Application Study – Presque Isle

Table 10 – 34 Entries

Most of these plump barleys had good 'low' protein contents and yielded excellent extract values. The soluble protein levels ranged from good to a third that were too high. The diastatic power values were low, reflecting the low total protein levels. All  $\alpha$ -amylase and most  $\beta$ -glucan levels were too high. The best performer was B1602, regardless of the amount of nitrogen applied.

## **Submissions from Minnesota**

2000 Advanced Lines (Group 1) – St. Paul and Crookston

Table 11 – 48 Entries

These barleys were plump and most had good protein contents; especially those from St. Paul. The extract values of the samples grown at St. Paul were very good, while nearly all of the Crookston grown samples had unacceptably low values. The soluble protein levels ranged from good to too high, while three quarters of the S/T ratios were above the desired limit. The diastatic power values were generally good to a bit low, while two thirds of the  $\alpha$ -amylase values were too high. The  $\beta$ -glucan values indicated that most of the samples grown in St Paul modified better than those that were grown in Crookston. The best performers, all from St Paul, were M96-80, M96-191, M95-91, Lacey, M106, Robust, M95-52 and M96-141.

2000 Advanced Lines (Group 2) – St. Paul and Morris

Table 12 – 46 Entries

These barleys were generally plump, but a third of the Morris submissions had unacceptably high protein contents. The extract values were generally poor in submissions from Morris and pretty good in those from St. Paul. The soluble protein levels were generally high in samples from Morris, while the St. Paul samples ranged between excellent and unacceptably high. Most of the S/T ratios were too high, while all but one  $\beta$ -glucan value fell within desired limits. The amylolitic values ranged between good and unacceptably high (about one third). The best performers were all from St. Paul. The lines M96-112, M96-67, M96-74, M96-185, M96-48, M96-205, M96-56, M96-186, M96-190 and M96-64 had very good quality scores.

2000 Advanced Lines (Group 3) – Crookston and Morris

Table 13 – 44 Entries

These plump barleys generally had good protein contents, but three quarters of their extract values were too low. Over a third of the soluble protein and S/T values were too high, while half of the amylolitic levels exceeded the desired upper limits. Most of the  $\beta$ -glucan levels were good. The best

performer was the M96-205 submission from Crookston. Several other lines had fairly high quality scores, but their extract values were mostly poor.

#### 2000 Advanced Lines (Group 4) – St. Paul and Crookston

Table 14 – 32 Entries

The protein contents of these submissions were excellent; but nearly a third of their extract values were too low. Most of the soluble protein levels were good, but the ‘good’ low total protein contents resulted in over three quarters of the S/T ratios exceeding the upper limit. About half of the amylolitic values were unacceptable, with the diastatic power values being too low and  $\alpha$ -amylase values being too high. Most of the  $\beta$ -glucan levels were good. The best performers were the following submissions from Crookston: FEG 14-76-1, Robust, Lacey and FEG 11-89 and from St. Paul: Robust and Lacey.

#### 2000 Advanced Lines (Group 5) – St. Paul and Crookston

Table 15 – 38 Entries

Most of these barleys were plump, with excellent low protein contents. A third of the extract values fell below the desired limit. The soluble protein levels were generally good, but when combined with the low total protein values, resulted in most S/T ratios being unacceptably high. Three quarters of the diastatic power values were too low, while two thirds of the  $\alpha$ -amylase values were too high. Most of the  $\beta$ -glucan levels were acceptable, but they ranged from too low to a bit high. The best performers, all from St. Paul, were Robust, Lacey, M96-150, M96-113 and M96-117.

#### 2000 Advanced Lines (Group 6) – St. Paul

Table 16 – 44 Entries

These plump barleys had excellent protein contents and good extract levels. Most of the soluble protein values were high and this resulted in all but two unacceptably high S/T ratios. The diastatic power levels were generally good, while two thirds of the  $\alpha$ -amylase values were a bit high. Most of the  $\beta$ -glucan levels were somewhat elevated, but acceptable. The best performers were Lacey, M97-28, M97-81, M97-22, Robust, M97-12 and M97-02. Except for their high soluble protein levels most of these lines malted very well.

## 2000 Advanced Lines (Group 7) – St. Paul

Table 17 – 48 Entries

These plump barleys had excellent protein contents, very good extract values and generally good  $\beta$ -glucan levels. All of the soluble protein levels were within acceptable limits, however nearly all of the S/T ratios were unacceptably high, due to the rather low, but desirable, total protein contents. Most of the diastatic power levels were too low, probably due to their low protein contents, while over half of the  $\alpha$ -amylase values were too high. The best performers were M97-120, M97-20, M97-18, M97-87, M97-16 M97-19, Lacey and M97-90, which show considerable promise for commercial utilization.

## 2000 Advanced Lines (Group 8) – Crookston

Table 18 – 44 Entries

These plump barleys had excellent protein contents, but half of the extract values were too low. The soluble protein levels ranged from excellent to too high. Two thirds of the diastatic power values were too low, while three quarters of the  $\alpha$ -amylase levels were too high. The  $\beta$ -glucan levels were high, with more than half exceeding the maximum limit. The best performers were Robust, M97-27, M97-21 and Lacey. Several other lines scored as well as these, but their low extract values would preclude them from industrial consideration.

## 2000 Advanced Lines (Group 9) – Crookston

Table 19 – 48 Entries

These barleys were plump and had excellent protein contents, but half of the extract values were too low. The soluble protein levels were generally very good, but the S/T ratios were high in over half of the lines, due to the low total protein values. Two thirds of the diastatic power values were too low, while half of the  $\alpha$ -amylase values exceeded the upper limit. A third of the  $\beta$ -glucan contents were unacceptably high. The best performers were M97-18, M97-19, M97-20, M97-17, Lacey and M97-53, but note that all of these lines had extract values that fell just below the desired minimum of 78%.

## 2000 Early Generation Lines (Group 10) – Crookston

Table 20 – 44 Entries

The protein contents of these plump barleys were excellent. The soluble protein levels were generally good, but most of the extract values were too low. Half of the diastatic power values were low, while two thirds of the  $\alpha$ -amylase and a third of the  $\beta$ -glucan levels were too high. The best performers were Lacey, M102/Lacey 497 and M102/Lacey 475.

## 2000 Early Generation Lines (Group 11) – Crookston

Table 21 – 42 Entries

These plump barleys had very good protein contents. The soluble protein levels ranged from excellent to a bit high, while two thirds of the extract values were below the minimum limit. Most of the diastatic power values were too low, and two thirds of the  $\alpha$ -amylase levels were too high. The  $\beta$ -glucan levels were generally a bit high, but only a dozen exceeded the maximum limit. The best performers were M94-50/M100 629, M94-50/M100 647 and M94-50/N100 653.

## 2000 Early Generation Lines (Group 12) – Crookston

Table 22 – 40 Entries

A quarter of these barleys were too thin, but their protein contents were excellent. The soluble protein levels were also very good, but over half of the extract values were too low. Most of the diastatic power values were too low, while half of the  $\beta$ -glucan and  $\alpha$ -amylase levels were too high. The best performers were M94-191/M100 741, M94-191 /M100 689, M94-50/M100 665, M94-191/M100 691, M94-191/M100 695, M104/M103 751 and M94-50/M100 661.

## 2000 Early Generation Lines (Group 13) – Crookston

Table 23 – 40 Entries

Even though three quarters of these barleys were too thin, their protein contents were generally excellent. Most of the extract values fell a bit below the minimum desired limit and most of the  $\beta$ -glucan levels were too high. Nearly all of the soluble protein levels were good, while the diastatic

power values were too low and the  $\alpha$ -amylase levels were a bit too high. The best performers were M105/Lacey 825, M104/M103 753 and M104/M103 755.

#### 2000 Early Generation Lines (Group 14) – Crookston

Table 24 – 45 Entries

Three quarters of these barleys were too thin, but their protein contents were excellent. Half of the extract values were below the desired minimum. The soluble protein levels ranged from excellent to six that exceeded the desired maximum. The diastatic power values were generally low, and most  $\alpha$ -amylase levels were a bit high. The  $\beta$ -glucan levels were generally high, indicating that our malting protocol under modified these barleys. The best performers were M105/Lacey 853, M105/Lacey 861, M105/Lacey 857 and M105/Lacey 849.

#### 2000 Early Generation Lines (Group 15) – Crookston

Table 25 – 45 Entries

Although most of these barleys were thin, their protein contents were excellent. A third of the extract values were too low, while three quarters of the  $\beta$ -glucan levels were too high. The soluble protein levels were very good, but two thirds of the S/T values exceeded the desired limit, even though both soluble and total protein values were excellent. The diastatic power values were generally low, while the  $\alpha$ -amylase values were too high. The best performers were GD6-33 and Lacey.

#### 2000 Early Generation Lines (Group 16) – Crookston

Table 26 – 16 Entries

Half of these barleys were too thin, while their protein contents ranged from a bit low to very good. Most of the soluble protein values were very good, but half of the extract values were too low. The diastatic power values were quite low, while  $\alpha$ -amylase levels were a bit high. The  $\beta$ -glucan levels were generally high, indicating that our malting protocol yielded under modified malts in this experiment. The best performer was BT459/M105 1091.

## 2000 Early Generation Lines (Group 17) – St. Paul

Table 27 – 27 Entries

These barleys were thin, but only five protein values exceeded the maximum limit. Most of the extract and  $\beta$ -glucan values were good. Two thirds of the soluble protein levels were too high and nearly all of the S/T ratios exceeded the maximum limit. Over half of the diastatic power values were too low and all of the  $\alpha$ -amylase values were too high. The best performer was M96-03/M105 1132.

## 2000 Early Generation Lines (Group 18) – St Paul

Table 28 – 27 Entries

The protein values of these thin barleys ranged from very good to a bit high. Over half of the soluble protein and a third of the  $\beta$ -glucan levels were too high. Over half of the diastatic power values fell below the desired minimum, and all  $\alpha$ -amylase levels were too high. The best performer was M96-03/M105 1186, but even it was not very good.

## Submissions from North Dakota

### 2000 Experiment 21A, Preliminary Yield Trial – Fargo

Table 29 – 25 Entries

Over half of these barleys were thin and although their protein contents were elevated, only one sample exceeded the desired protein limit. Most of the extract values were unacceptably low, while nearly half of the soluble protein and S/T values were too high. The diastatic power values ranged from one that was too low, to eight that were too high, while all but two  $\alpha$ -amylase values were unacceptably high. The  $\beta$ -glucan levels were very good. None of these lines performed very well.

### 2000 Experiment 21B, Preliminary Yield Trial – Fargo

Table 30 – 32 Entries

Although two thirds of these barleys were too thin, their protein contents were generally very good. Two thirds of the extract values fell below the desired limit. The soluble protein levels tended to be a

bit high, although only five exceeded the upper limit. Due to the elevated soluble protein values and reasonable total protein contents, two thirds of the S/T ratios were unacceptably high. The diastatic power values ranged between eight that were too low to five that exceeded the maximum limit, while all of the  $\alpha$ -amylase values were too high. The  $\beta$ -glucan levels ranged from excellent to a bit high. The best performer was ND18539.

#### 2000 Experiment 22, Preliminary Yield Trial – Fargo

Table 31 – 45 Entries

Most of the protein contents were very good in these thin barleys. Two thirds of their extract values were too low; the soluble protein levels were generally good, with eight that were a bit high. Most of the  $\beta$ -glucan and diastatic power values were good, while nearly all of the  $\alpha$ -amylase values exceeded the desired limit. The best performers were ND18639, ND18562 and ND18573.

#### 2000 Experiment 23, Preliminary Yield Trial – Fargo

Table 32 – 22 Entries

The protein contents of these barleys were good, even though half of the samples were too thin. Most of the extract values fell below the desired limit. About half of the soluble protein and S/T values were too high. The  $\beta$ -glucan and diastatic power values were generally good, while all but four  $\alpha$ -amylase values were too high. The submissions ND18683 and ND18757 had good quality scores, but their low extract values would preclude them from commercial consideration.

#### 2000 Experiment 24, Preliminary Yield Trial – Fargo

Table 33 – 38 Entries

The protein contents of these thin barleys were generally quite good. Most of the extract values fell below the desired limit. A third of the soluble protein and half of the S/T values were too high. The diastatic power values ranged between five that were too low and fourteen that were too high, while all but two  $\alpha$ -amylase values were too high. The  $\beta$ -glucan levels were generally good. The malt quality parameters of ND18844 look pretty good and this line would have had the highest quality score had the barley been slightly plumper.

## 2000 Experiment LA41, Langdon Preliminary Yield Trial – Langdon

Table 34 – 22 Entries

Half of these barleys were thin and all but four had unacceptably high protein contents. A quarter of the extract values fell below the desired limit and a third of the soluble protein levels were too high. A third of the diastatic power, half of the  $\beta$ -glucan and two thirds of the  $\alpha$ -amylase values exceeded the desired limits. The best performer was ND16461-1, but even it did not modify very well as shown by its high  $\beta$ -glucan content.

## 2000 Experiment LA42, Langdon Preliminary Trial – Langdon

Table 35 – 26 Entries

Over half of these barleys were too thin and most had unacceptably high protein contents. A third of the extract values were below the desired limit, while soluble protein levels ranged from several lines with excellent levels, to ten that were unacceptably high. Half of the diastatic power and  $\beta$ -glucan levels were too high, while two thirds of the  $\alpha$ -amylase values exceeded the upper limit. The best performer was 2N18948, which looked very promising.

## 2000 Experiment LA43, Langdon Preliminary Yield Trial – Langdon

Table 36 – 22 Entries

Over half of these barleys were thin and three quarters had unacceptably high protein levels. A quarter of the extract values were too low, while half of the soluble protein values were too high. A third of the diastatic power and two thirds of the  $\alpha$ -amylase values exceeded the upper limit. All of the 2 rowed samples had elevated  $\beta$ -glucan levels. The best performers were 2N18981 and 2N18987, but even these had very high  $\beta$ -glucan levels.

## 2000 Experiment LA44, Langdon Preliminary Yield Trial - Langdon

Table 37 – 22 Entries

Over half of these barleys were too thin and nearly three quarters of them had unacceptably high protein contents. The extract values were generally good, averaging 79.8%. The soluble protein

values ranged from excellent to nine that exceeded the upper limit. Half of the diastatic power and all but three  $\alpha$ -amylase values were too high. Two thirds of the  $\beta$ -glucan levels were above the upper limit. The best performers were 2N19051, 2N19053 and 2N19054, however note their rather high soluble protein,  $\alpha$ -amylase and  $\beta$ -glucan levels.

#### 2000 Experiment LA45, Langdon Preliminary Trial – Langdon

Table 38 – 19 Entries

Half of these barleys were thin and three quarters of them had unacceptably high protein contents. The extract values were generally good, but half of the soluble protein contents were too high. A third of the diastatic power, two thirds of the  $\beta$ -glucan and nearly all of the  $\alpha$ -amylase levels were above the desired limits. The best performers were 2N19099, 2N19100 and 2N19101.

#### 2000 Experiment LA46, Langdon Preliminary Yield Trial – Langdon

Table 39 – 25 Entries

Half of these barleys were too thin and had unacceptably high protein contents. Most of the extract and soluble protein values were good. One third of the diastatic power and two thirds of the  $\alpha$ -amylase values were too high, and most of the  $\beta$ -glucan levels exceeded the maximum limit. None of these lines performed very well. 2N19119 had the best quality score and a good extract value, however its very high soluble protein level would preclude its commercial use.

#### 2000 Experiment LA47, Langdon Preliminary Yield Trial – Langdon

Table 40 – 20 Entries

Most of these thin barleys had elevated protein levels. Half of the extract values were below the desired minimum, however a quarter of the extract levels were exceptional, at 84% or greater. Most of the soluble protein levels were acceptable and similar to Conlon, while three quarters of the  $\alpha$ -amylase and  $\beta$ -glucan values were too high. None of these lines performed very well, mostly due to the physical characteristics of the barley (thin with high protein contents).

#### 2000 Experiment 3, Intermediate Yield Trial – Carrington

Table 41 – 54 Entries – 3 Replicates

Half of these thin barleys had unacceptably high protein contents. Most extract values were too low, while over half of the soluble protein levels were too high. Most amylolitic values exceeded the desired limits, while  $\beta$ -glucan levels ranged from good to a bit high. None of these lines performed well, including the experimental controls.

#### 2000 Experiment 2, Advanced Yield Trial – Carrington

Table 42 – 39 Entries – 3 Replicates

Over half of these thin barleys had unacceptably high protein contents. Three quarters of the extract values were too low, while half of the soluble protein levels were above the desired limit. Most of the amylolitic values were too high, while nearly half of the  $\beta$ -glucan levels exceeded the maximum limit. None of these entries performed well, although ND17134 might have made good malt if the sample had been plumper.

#### 2000 Experiment 1, Varietal Yield Trial – Carrington

Table 43 – 51 Entries – 3 Replicates

A third of these thin barleys had unacceptably high protein contents. Two thirds of the extract values were too low, while half of the soluble protein levels were too high. Over half of the diastatic power and most of the  $\alpha$ -amylase values were too high. A third of the  $\beta$ -glucan contents were above the maximum limit. ND16301 performed best in the three replicates and certainly would have scored higher if the barley had been plumper.

#### 2000 Experiment LA11, Langdon Variety Yield Trial – Langdon

Table 44 – 12 Entries

Five of these thin barleys had unacceptably high protein contents. Their extract values were quite good, while half of the soluble protein levels were too high. The diastatic power values were generally good, but three quarters of the  $\alpha$ -amylase values exceeded the maximum limit. The  $\beta$ -glucan levels

were a bit elevated, although only four were unacceptably high. None of these lines performed very well.

#### 2000 Experiment LA12, Langdon Advanced Yield Trial – Langdon

Table 45 – 19 Entries

Two thirds of these barleys were too thin and half had unacceptably high protein contents. The extract values were good, with only one being too low. A third of the soluble protein, diastatic power and  $\beta$ -glucan values were too high. Most of the  $\alpha$ -amylase levels exceeded the maximum limit. The best performer was 2N17318.

#### 2000 Experiment LA 13, Langdon Intermediate Yield Trial – Langdon

Table 46 – 15 Entries

A third of these barleys had unacceptably high protein contents, while their extract values were generally good. A third of the soluble protein and half of the amylolitic values were too high. The  $\beta$ -glucan levels ranged from very good to very high. The best performers were 2N18160 and Conlon.

#### 2000 Experiment LA14, Langdon Intermediate Yield Trial – Langdon

Table 47 – 16 Entries

Half of these barleys were too thin and all had unacceptably high protein contents. The extract values were generally good, while the soluble protein levels ranged from excellent to six that were unacceptably high. Half of the diastatic power, all of the  $\alpha$ -amylase and three quarters of the  $\beta$ -glucan values exceeded the maximum limits. None of these lines performed well at this location.

2000 Experiment LA15, Langdon Intermediate Yield Trial – Langdon

Table 48 – 15 Entries

All of these thin barleys had unacceptably high protein contents. The extract values were quite good, but half of the soluble protein and  $\beta$ -glucan values were too high. Most of the amylolitic values exceeded the maximum limit. None of these lines performed well.

2000 Experiment CR11, Carrington Variety Yield Trial – Carrington

Table 49 – 12 Entries

Most of these barleys were too thin and all had unacceptably high protein contents. Half of the extract values were too low, while half of the soluble protein levels were too high. The diastatic power and  $\beta$ -glucan values were pretty good, but all of the  $\alpha$ -amylase levels were too high. None of these lines performed well.

2000 Experiment CR12, Carrington Advanced Yield Trial – Carrington

Table 50 – 19 Entries

All but one of these thin barleys had unacceptably high protein contents. A third of the extract values were too low, while half of the soluble protein levels were too high. The diastatic power and  $\beta$ -glucan levels were generally good, while all  $\alpha$ -amylase values exceeded the maximum limit. None of these lines performed well.

2000 Experiment CR13, Carrington Intermediate Yield Trial – Carrington

Table 51 – 15 Entries

All of these thin barleys had unacceptably high protein contents. Half of the extract values were too low, while the soluble protein levels were quite high. Half of the diastatic power and all of the  $\alpha$ -amylase values were too high. Half of the  $\beta$ -glucan levels were very good. None of these lines performed very well.

2000 Experiment CR14, Carrington Intermediate Yield Trial – Carrington

Table 52 – 16 Entries

Over half of these barleys were too thin and all but two had unacceptably high protein contents. A quarter of the extract values were too low, while half of the soluble protein values were too high. Half of the diastatic power and all of the  $\alpha$ -amylase values were too high. The  $\beta$ -glucan levels were generally a bit high. None of these lines performed very well.

2000 Experiment CR15, Carrington Intermediate Yield Trial – Carrington

Table 53 – 15 Entries

All but two of these thin barleys had unacceptably high protein contents. A third of the extract values were too low, while half of the soluble protein, diastatic power and  $\beta$ -glucan levels were too high. All but one of the  $\alpha$ -amylase levels exceeded the maximum limit. None of these lines performed well.

2000 Experiment MI11, Minot Variety Yield Trial – Minot

Table 54 –12 Entries

All but two of these thin barleys had unacceptably high protein contents. Two thirds of the extract values were too low, while a third of the soluble protein levels were too high. The diastatic power values ranged from two that were too low to two that exceeded the maximum limit. Three quarters of the  $\alpha$ -amylase and half of the  $\beta$ -glucan levels were too high. None of these lines performed well.

2000 Experiment MI12, Minot Advanced Yield Trial – Minot

Table 55 – 19 Entries

All but two of these thin barleys had unacceptably high protein contents, and half of the extract values were below the minimum limit. The soluble protein levels ranged from excellent to four that were too high. Most of the diastatic power values were good, while two thirds of the  $\alpha$ -amylase levels were too high. Most of the  $\beta$ -glucan levels were high, indicating that these malts were poorly modified. None of these lines performed well.

#### 2000 Experiment MI13, Minot Intermediate Yield Trial – Minot

Table 56 – 15 Entries

Over half of these thin barleys had unacceptably high protein contents. A quarter of the extract values were too low, while the soluble protein levels ranged from very good to six that exceeded the maximum limit. Half of the amylolitic values were too high. The  $\beta$ -glucan levels were generally high, indicating that these malts were poorly modified. The submission 2N18160 shows some malting quality and would have scored better if it had been plumper.

#### 2000 Experiment MI14, Minot Intermediate Yield Trial – Minot

Table 57 – 16 Entries

All but three of these thin barleys had unacceptably high protein contents and a third of their extract values fell below the desired limit. The soluble protein levels ranged from six that were very good to four that exceeded the maximum limit. The diastatic power levels were quite variable, with two that were too low and four that exceeded the maximum limit. Half of the  $\alpha$ -amylase values were too high. All but one of the  $\beta$ -glucan levels were above the maximum limit. None of these lines performed very well.

#### 2000 Experiment MI15, Minot Intermediate Yield Trial – Minot

Table 58 – 15 Entries

Nine of these thin barleys had unacceptably high protein contents. All but four extract values were pretty good and only four soluble protein levels were too high. Most of the diastatic power values were good, while all but two  $\alpha$ -amylase values exceeded the maximum limit. Two thirds of the  $\beta$ -glucan levels were too high. None of these lines performed well.

#### 2000 Beacon/Hazen Progeny Analysis – Fargo and Prosper

Table 59 – 362 Entries

The protein contents of these exceptionally thin barleys were generally a bit high, but acceptable. Almost two thirds of the extract and nearly half of the diastatic power values were too low. A third of

the soluble protein and three quarters of the  $\alpha$ -amylase values were above the maximum limits, while the  $\beta$ -glucan levels were generally very good. The best performers, all from the 2<sup>nd</sup> replicate (Prosper) were BH89, BH93, BH144, BH114 and Hazen. The increased plumpness (nearly twofold) of the 2<sup>nd</sup> replicate positively affected the extract values, which averaged 3.5% higher than those of the first replicate.

**Table 1 Entries in the Mississippi Valley Uniform Barley Nursery - 2000 Crop**

| Entry No. | New Entry      | CI# or Contributor | Name      | Rowed | Parentage  |
|-----------|----------------|--------------------|-----------|-------|--|
| 1         | 5105           | Barbless           |           | 6     | Oderbrucker/Lion                                 |
| 2         | 10648          | Larker             |           | 6     | Titan/Kindred/3/Newal/Peatland//Montcalm         |
| 3         | 15773          | Morex              |           | 6     | Cree/Bonanza                                     |
| 4         | 476976         | Robust             |           | 6     | Morex/Manker                                     |
| 5         | Minnesota      | Stander (M64)      |           | 6     | Robust 2*/3/Cree/Bonanza//Manker/4/Robust/Bumper |
| 6         | North Dakota   | Foster (ND 11055)  |           | 6     | Robust/3/ND5570//Glenn/Karl                      |
| 7         | Busch Ag. Res. | 6B93-2978          |           | 6     | Bumper/Karl//Bumper/Manker/3/Bumper/Karl/4/Excel |
| 8         | Minnesota      | MNBrite (MNS85)    |           | 6     | M90-89/M69                                       |
| 9         | North Dakota   | Drummond (ND15477) |           | 6     | ND9712//Stander/ND12200                          |
| 10        | Minnesota      | Lacey (M98)        |           | 6     | M78/M79  |
| 11        | Busch Ag. Res. | 6B94-8253          |           | 6     | B1614/Stander                                    |
| 12        | Minnesota      | M103               |           | 6     | M84/M81  |
| 13        | Minnesota      | M104               |           | 6     | M92-211/M83                                      |
| 14        | North Dakota   | ND16301            |           | 6     | Foster//ND12200/6B88-3213                        |
| 15        | North Dakota   | 2ND16461           |           | 2     | ND13296/ND14760                                  |
| 16        | Busch Ag.      | 6B95-2482          |           | 6     | 6B89-2126/ND10981                                |
| 17        | Busch Ag.      | 6B96-3733          |           | 6     | B3213//6B89-2126/Foster                          |
| 18        | Saskatchewan   | BT462              |           | 6     | BT409/Foster                                     |
| 19        | X              | Minnesota          | M106      | 6     | M92-334/M81                                      |
| 20        | X              | Minnesota          | M107      | 6     | M92-334/M81                                      |
| 21        | X              | Minnesota          | M108      | 6     | M92-395/M83                                      |
| 22        | X              | North Dakota       | ND15422   | 6     | ND9712//ND11646/Stander                          |
| 23        | X              | North Dakota       | ND17079   | 6     | ND12738//ND14119/F103-79                         |
| 24        | X              | North Dakota       | ND17082   | 6     | ND12738//ND14119/F103-79                         |
| 25        | X              | North Dakota       | ND17090   | 6     | ND14490/ND15608                                  |
| 26        | X              | North Dakota       | 2ND17275  | 2     | Conlon/ND15238                                   |
| 27        | X              | Busch Ag.          | 6B95-2089 | 6     | 6B84-2912/B1601//6B88-3213                       |
| 28        | X              | Busch Ag.          | 6B96-3373 | 6     | B1614//6B88-3521/Excel                           |
| 29        | X              |                    | BT470     | 6     | M75/SM93058                                      |
| 30        | X              | Saskatchewan       | BT478     | 6     | M67/SM93067                                      |

## MISSISSIPPI VALLEY UNIFORM BARLEY NURSERY - 2000 Crop

Table 2 - Station Means\* of Barley and Malt Quality Factors for 30 Varieties or Selections\*\*.

| Location      | Barley                   |                           |                             |                        |                      |                          |                        |        |           |                               |                          | Ave.<br>Quality<br>Score |
|---------------|--------------------------|---------------------------|-----------------------------|------------------------|----------------------|--------------------------|------------------------|--------|-----------|-------------------------------|--------------------------|--------------------------|
|               | Kernel<br>Weight<br>(mg) | Barley<br>on 6/64"<br>(%) | Barley<br>Color<br>(Agtron) | Malt<br>Extract<br>(%) | Wort<br>Color<br>(%) | Barley<br>Protein<br>(%) | Wort<br>Protein<br>(%) | S/T    | DP<br>(°) | Alpha-<br>amylase<br>(20° DU) | Beta-<br>glucan<br>(ppm) |                          |
|               |                          |                           |                             |                        |                      |                          |                        |        |           |                               |                          |                          |
| Morris, MN    | 34.8 A                   | 83.2 A                    | 38 C                        | 78.2 B                 | 2.1 A                | 14.0 B                   | 5.85 A                 | 43.5 A | 158 AB    | 74.6 B                        | 186 A                    | 30                       |
| Bottineau, ND | 31.6 B                   | 79.9 A                    | 44 B                        | 79.3 A                 | 2.4 B                | 13.3 A                   | 5.81 A                 | 45.6 A | 147 A     | 70.1 A                        | 217 A                    | 33                       |
| Fargo, ND     | 28.9 C                   | 45.5 B                    | 48 A                        | 77.2 C                 | 2.1 A                | 13.4 A                   | 5.76 A                 | 44.8 A | 161 B     | 78.7 B                        | 187 A                    | 22                       |

\* Within each column, means followed by the same letter are not significantly different ( $\alpha=0.05$ ), according to Duncan's Multiple Range test

\*\* Barbless, Larker, Morex, Robust, Stander, Foster, 6B93-2978, MNBrite, Drummond, Lacey, 6B94-8253, M103, M104, ND16301 2ND16461, 6B95-2482, 6B96-3733, BT462, M106, M107, M108, ND15422, ND17079, ND17082, ND17190, 2ND17275, 6B95-2089, 6B96-3373, BT470, BT478

### MISSISSIPPI VALLEY UNIFORM BARLEY NURSERY - 2000 Crop

Table 3 - Varietal Means\* of Barley and Malt Quality Factors for 3 Stations\*\*.

| Variety   | Rowed | Barley Kernel Weight (mg) | Barley Color on 6/64 (%) | Malt Extract (Agtron) | Wort Color (%) | Barley Protein (%) | Wort Protein (%) | S/T (%)       | DP (°)        | Alpha-amylase (20° DU) | Beta-glucan (ppm) | Ave. Quality Score | Overall Rank |
|-----------|-------|---------------------------|--------------------------|-----------------------|----------------|--------------------|------------------|---------------|---------------|------------------------|-------------------|--------------------|--------------|
| BARBLESS  | 6     | 30.9 BC                   | 61.9 A                   | 40 A                  | 74.2 C         | 1.9 ABCD           | 14.8 E           | 4.97 A        | 34.4 A        | 162 ABCDEF             | 64.3 AB           | 442 F              | 18 29        |
| LARKER    | 6     | 31.5 ABC                  | 69.0 A                   | 40 A                  | 77.5 AB        | 2.3 ABCDE          | 13.8 BCDE        | 5.72 BCDEFGHI | 43.2 BCDEFG   | 151 DEFG               | 66.5 BC           | 199 ABCDE          | 28 19        |
| MOREX     | 6     | 30.1 C                    | 61.5 A                   | 44 A                  | 77.6 AB        | 2.2 ABCDE          | 13.9 BCDE        | 5.92 DEFGHI   | 44.1 BCDEFGH  | 159 ABCDEF             | 74.5 BCD          | 170 ABCDE          | 27 21        |
| ROBUST    | 6     | 31.3 ABC                  | 65.8 A                   | 43 A                  | 78.0 AB        | 1.8 ABC            | 14.3 CDE         | 5.69 BCDEFGHI | 41.0 B        | 166 ABCDE              | 53.2 A            | 302 E              | 31 11        |
| STANDER   | 6     | 31.9 ABC                  | 73.6 A                   | 42 A                  | 79.0 A         | 2.7 BCDE           | 13.3 ABC         | 6.24 GHIJ     | 49.4 HI       | 143 EFG                | 76.1 BCD          | 159 ABCDE          | 30 14        |
| FOSTER    | 6     | 32.2 ABC                  | 73.1 A                   | 41 A                  | 77.6 AB        | 2.1 ABCDE          | 12.9 AB          | 5.47 ABCDE    | 43.8 BCDEFGH  | 142 EFG                | 66.8 BC           | 281 CDE            | 31 11        |
| 6B93-2978 | 6     | 29.9 C                    | 62.9 A                   | 46 A                  | 78.5 AB        | 2.4 ABCDE          | 13.2 ABC         | 6.21 FGHIJ    | 48.0 EFGHI    | 154 CDEFG              | 79.3 BCD          | 287 DE             | 24 24        |
| MNBRITE   | 6     | 31.1 ABC                  | 70.4 A                   | 50 A                  | 77.9 AB        | 2.7 CDE            | 14.6 DE          | 6.65 J        | 47.0 CDEFGHI  | 187 A                  | 76.2 BCD          | 105 AB             | 19 28        |
| DRUMMOND  | 6     | 31.0 BC                   | 69.1 A                   | 47 A                  | 78.3 AB        | 2.0 ABCD           | 13.5 ABCD        | 5.54 ABCDEF   | 42.5 BCDEF    | 162 ABCDEF             | 74.2 BCD          | 171 ABCDE          | 35 1         |
| LACEY     | 6     | 31.8 ABC                  | 71.2 A                   | 44 A                  | 78.6 A         | 1.9 ABCD           | 13.6 BCD         | 5.52 ABCDEF   | 42.5 BCDEF    | 165 ABCDE              | 71.9 BCD          | 184 ABCDE          | 34 2         |
| 6B94-8253 | 6     | 33.1 ABC                  | 75.9 A                   | 42 A                  | 77.6 AB        | 2.0 ABCDE          | 13.8 BCDE        | 5.47 ABCDE    | 41.7 BC       | 153 CDEFG              | 70.1 BCD          | 219 ABCDE          | 34 2         |
| M103      | 6     | 32.8 ABC                  | 70.6 A                   | 44 A                  | 78.3 AB        | 2.4 ABCDE          | 13.6 ABCD        | 6.30 HIJ      | 48.6 GHI      | 154 CDEFG              | 75.6 BCD          | 91 A               | 25 23        |
| M104      | 6     | 29.6 C                    | 59.9 A                   | 44 A                  | 79.0 A         | 2.3 ABCD           | 13.0 ABC         | 6.21 FGHIJ    | 48.2 FGHI     | 149 EFG                | 81.0 CD           | 179 ABCDE          | 30 14        |
| ND16301   | 6     | 32.2 ABC                  | 76.9 A                   | 45 A                  | 79.0 A         | 2.0 ABCDE          | 13.3 ABC         | 5.64 ABCDEFGH | 45.1 BCDEFGH  | 177 ABCD               | 76.6 BCD          | 135 ABCDE          | 33 5         |
| 2ND16461  | 2     | 37.2 A                    | 72.5 A                   | 39 A                  | 79.1 A         | 1.7 A              | 12.7 A           | 5.03 AB       | 42.2 BCDEF    | 109 H                  | 76.5 BCD          | 263 BCDE           | 33 5         |
| 6B95-2482 | 6     | 31.4 ABC                  | 70.9 A                   | 43 A                  | 79.0 A         | 1.8 AB             | 13.7 BCDE        | 5.54 ABCDEFG  | 42.0 BCD      | 181 ABC                | 74.4 BCD          | 160 ABCDE          | 30 14        |
| 6B96-3733 | 6     | 33.3 ABC                  | 79.9 A                   | 44 A                  | 79.8 A         | 2.1 ABCDE          | 13.0 AB          | 5.96 DEFGHIJ  | 47.9 DEFGHI   | 162 ABCDE              | 82.3 D            | 235 ABCDE          | 33 5         |
| BT462     | 6     | 31.9 ABC                  | 68.6 A                   | 41 A                  | 78.3 AB        | 2.0 ABCDE          | 13.0 AB          | 5.10 ABC      | 40.9 B        | 135 FG                 | 71.8 BCD          | 234 ABCDE          | 33 5         |
| M106      | 6     | 31.2 ABC                  | 66.8 A                   | 43 A                  | 78.7 A         | 2.0 ABCDE          | 13.8 BCDE        | 5.87 DEFGHI   | 44.9 BCDEFGHI | 162 ABCDEF             | 79.9 CD           | 116 ABC            | 28 19        |
| M107      | 6     | 31.8 ABC                  | 60.3 A                   | 43 A                  | 79.7 A         | 2.5 ABCDE          | 13.2 ABC         | 6.12 EFGHIJ   | 48.1 FGHI     | 157 BCDEFG             | 75.7 BCD          | 90 A               | 33 5         |
| M108      | 6     | 31.6 ABC                  | 68.7 A                   | 43 A                  | 79.2 A         | 2.4 ABCDE          | 13.0 AB          | 6.03 DEFGHIJ  | 48.6 GHI      | 143 EFG                | 77.1 BCD          | 105 AB             | 34 2         |
| ND15422   | 6     | 31.6 ABC                  | 67.8 A                   | 46 A                  | 78.0 AB        | 2.0 ABCDE          | 13.5 ABCD        | 5.68 BCDEFGHI | 43.3 BCDEFG   | 183 AB                 | 81.5 CD           | 146 ABCDE          | 30 14        |
| ND17079   | 6     | ABC                       | 75.5 A                   | 42 A                  | 77.7 AB        | 2.1 ABCDE          | 14.3 CDE         | 5.87 DEFGHI   | 43.0 BCDEFG   | 183 AB                 | 76.3 BCD          | 290 DE             | 20 27        |
| ND17082   | 6     | 31.0 BC                   | 70.9 A                   | 43 A                  | 77.7 AB        | 2.1 ABCDE          | 13.5 ABCD        | 5.50 ABCDEF   | 43.3 BCDEFG   | 167 ABCDE              | 74.1 BCD          | 298 E              | 30 14        |
| ND17190   | 6     | 31.3 ABC                  | 77.4 A                   | 40 A                  | 76.0 BC        | 2.9 E              | 13.4 ABCD        | 6.39 IJ       | 50.2 I        | 104 H                  | 71.1 BCD          | 257 ABCDE          | 18 29        |
| 2ND17275  | 2     | 36.4 AB                   | 78.6 A                   | 45 A                  | 79.5 A         | 2.8 DE             | 14.4 CDE         | 6.66 J        | 48.2 FGHI     | 109 H                  | 84.7 D            | 171 ABCDE          | 21 26        |
| 6B95-2089 | 6     | 30.9 BC                   | 69.1 A                   | 42 A                  | 78.7 A         | 1.8 ABC            | 13.5 ABCD        | 5.47 ABCDE    | 42.0 BCDE     | 185 AB                 | 74.5 BCD          | 143 ABCDE          | 31 11        |
| 6B96-3373 | 6     | 30.5 BC                   | 66.9 A                   | 43 A                  | 77.4 AB        | 2.1 ABCDE          | 13.8 BCDE        | 5.40 ABCD     | 40.4 B        | 178 ABCDEF             | 79.2 BCD          | 207 ABCDE          | 23 25        |
| BT470     | 6     | 30.2 C                    | 66.4 A                   | 47 A                  | 78.7 A         | 2.6 ABCDE          | 13.4 ABCD        | 6.16 EFGHIJ   | 47.9 EFGHI    | 161 ABCDEF             | 76.2 BCD          | 127 ABCD           | 26 22        |
| BT478     | 6     | 30.6 BC                   | 63.9 A                   | 46 A                  | 78.9 A         | 2.3 ABCDE          | 13.0 AB          | 5.78 CDEFGHI  | 45.7 BCDEFGHI | 133 G                  | 72.8 BCD          | 126 ABCD           | 32 10        |

\* Within each column, means followed by the same letter are not significantly different ( $\alpha=0.05$ ), according to Duncan's Multiple Range test.

\*\* Morris, MN, Bottineau and Fargo, ND

## 2000 MISSISSIPPI VALLEY REGIONAL NURSERY - MORRIS, MN

Table 4

| Lab No. | Variety or Selection | Rowed | Kernel | on    | Barley | Malt    | Barley     | Wort         | Alpha-      | Beta-       | Overall |               |      |      |    |    |
|---------|----------------------|-------|--------|-------|--------|---------|------------|--------------|-------------|-------------|---------|---------------|------|------|----|----|
|         |                      |       | Weight | 6/64" | Color  | Extract | Wort Color | Wort Clarity | Protein (%) | Protein (%) |         | Quality Score | Rank |      |    |    |
| 3129    | BARBLESS             | 6     | 33.6   | *67.8 | 40     | 74.7    | 1.9        | 2            | 15.6        | 5.43        | 36.4    | 151           | 56.4 | 320  | 20 | 26 |
| 3130    | LARKER               | 6     | 34.5   | 80.2  | 32     | 76.0    | 2.0        | 2            | 15.5        | 5.58        | 38.1    | 176           | 61.5 | 252  | 17 | 30 |
| 3131    | MOREX                | 6     | 33.1   | 75.0  | 41     | 78.1    | 2.3        | 1            | 14.7        | 6.29        | 43.3    | 175           | 80.7 | 163  | 22 | 23 |
| 3132    | ROBUST               | 6     | 34.4   | 80.4  | 39     | 78.3    | 2.0        | 2            | 14.7        | 5.81        | 41.0    | 159           | 53.5 | 306  | 37 | 7  |
| 3133    | STANDER              | 6     | 35.2   | 85.0  | 36     | 79.2    | 2.7        | 1            | 13.6        | 6.26        | 48.6    | 149           | 80.9 | 179  | 34 | 13 |
| 3134    | FOSTER               | 6     | 35.3   | 86.0  | 37     | 77.7    | 2.2        | 2            | 12.9        | 5.53        | 43.7    | 141           | 67.4 | 286  | 34 | 13 |
| 3135    | 6B93-2978            | 6     | 32.4   | 79.7  | 30     | 78.0    | 2.3        | 1            | 14.2        | 6.39        | 46.7    | 163           | 77.3 | *453 | 20 | 26 |
| 3136    | MNBRITE              | 6     | 34.3   | 85.5  | 45     | 78.4    | 2.0        | 1            | 14.5        | 6.35        | 45.0    | 198           | 78.7 | 151  | 24 | 20 |
| 3137    | DRUMMOND             | 6     | 33.3   | 80.5  | 40     | 78.4    | 1.9        | 1            | 13.3        | 5.42        | 43.0    | 162           | 86.9 | 141  | 40 | 2  |
| 3138    | LACEY                | 6     | 34.5   | 85.5  | 40     | 78.9    | 1.8        | 2            | 13.4        | 5.18        | 39.8    | 153           | 68.5 | 176  | 40 | 2  |
| 3140    | 6B94-8253            | 6     | 36.1   | 82.9  | 35     | 77.2    | 2.0        | 1            | 14.0        | 5.32        | 40.0    | 160           | 63.4 | 186  | 35 | 11 |
| 3141    | M103                 | 6     | 37.0   | 87.4  | 39     | 78.1    | 2.4        | 1            | 14.3        | 6.65        | 47.2    | 166           | 83.2 | 44   | 23 | 21 |
| 3142    | M104                 | 6     | 33.9   | 84.0  | 42     | 79.7    | 2.0        | 1            | 13.5        | 5.83        | 45.3    | 137           | 81.4 | 307  | 36 | 10 |
| 3143    | ND16301              | 6     | 34.2   | 84.6  | 40     | 79.0    | 2.0        | 1            | 13.6        | 5.62        | 44.0    | 184           | 77.0 | 125  | 39 | 4  |
| 3144    | 2ND16461             | 2     | *41.2  | 86.8  | 32     | 79.5    | 1.7        | 1            | 12.5        | 5.10        | 41.7    | 93            | 76.2 | 208  | 37 | 7  |
| 3145    | 6B95-2482            | 6     | 35.5   | 89.0  | 36     | 79.8    | 1.8        | 1            | 14.0        | 5.62        | 40.8    | 200           | 71.9 | 133  | 34 | 13 |
| 3146    | 6B96-3733            | 6     | 36.0   | 89.2  | 38     | 80.5    | 2.1        | 1            | 12.8        | 5.97        | 48.6    | 165           | 84.6 | 171  | 37 | 7  |
| 3147    | BT462                | 6     | 34.9   | 80.6  | 32     | 77.6    | 2.0        | 2            | 14.1        | 5.31        | 37.9    | 137           | 71.4 | 216  | 21 | 25 |
| 3148    | M106                 | 6     | 34.9   | 84.0  | 38     | 78.9    | 2.1        | 1            | 14.5        | 5.98        | 43.8    | 163           | 77.2 | 98   | 35 | 11 |
| 3149    | M107                 | 6     | 36.1   | 80.0  | 39     | 80.2    | 2.1        | 1            | 13.4        | 5.96        | 46.4    | 161           | 74.3 | 101  | 41 | 1  |
| 3150    | M108                 | 6     | 34.6   | 84.4  | 40     | 79.2    | 2.2        | 1            | 12.8        | 5.72        | 46.7    | 139           | 74.7 | 121  | 38 | 6  |
| 3151    | ND15422              | 6     | 34.0   | 77.2  | 41     | 77.0    | 2.2        | 1            | 14.2        | 5.87        | 41.7    | 198           | 80.5 | 109  | 27 | 18 |
| 3152    | ND17079              | 6     | 35.0   | 88.9  | 39     | 77.4    | 2.1        | 1            | 14.9        | 6.02        | 41.4    | 193           | 76.0 | 211  | 20 | 26 |
| 3153    | ND17082              | 6     | 33.2   | 84.7  | 41     | 77.3    | 2.1        | 1            | 14.0        | 5.61        | 43.1    | 167           | 75.3 | 169  | 32 | 16 |
| 3154    | ND17190              | 6     | 33.4   | 86.2  | 38     | 75.1    | 2.8        | 1            | 13.6        | 6.53        | 50.4    | 120           | 74.5 | 206  | 20 | 26 |
| 3155    | 2ND17275             | 2     | 39.3   | 84.7  | 40     | 79.5    | 2.1        | 1            | 14.8        | 6.39        | 45.3    | 105           | 95.1 | 261  | 23 | 21 |
| 3156    | 6B95-2089            | 6     | 33.3   | 82.8  | 34     | 78.6    | 1.9        | 1            | 13.8        | 5.67        | 42.9    | 192           | 77.5 | 75   | 32 | 16 |
| 3157    | 6B96-3373            | 6     | 32.7   | 81.7  | 38     | 77.7    | 2.2        | 1            | 14.1        | 5.95        | 43.7    | 172           | 76.8 | 137  | 27 | 18 |
| 3158    | BT470                | 6     | 33.7   | 94.1  | 42     | 79.0    | 2.2        | 1            | 13.9        | 5.97        | 43.6    | 170           | 66.3 | 156  | 39 | 4  |
| 3159    | BT478                | 6     | 33.5   | 76.0  | 39     | 78.0    | 2.4        | 1            | 14.1        | 6.10        | 44.3    | 104           | 69.7 | 114  | 22 | 23 |

Table 4

| Lab No.                   | Variety or Selection | Rowed | Kernel | on    | Barley | Malt    | Barley | Wort | Alpha-  | Beta- | Overall |         |       |      |    |
|---------------------------|----------------------|-------|--------|-------|--------|---------|--------|------|---------|-------|---------|---------|-------|------|----|
|                           |                      |       | Weight | 6/64" | Color  | Extract | Wort   | Wort | Protein | S/T   | DP      | Quality | Score | Rank |    |
| 3139                      | MOREX MALT CHECK     | 6     | 30.9   | 71.2  | 67     | 80.0    | 1.6    | 1    | 12.6    | 5.45  | 46.3    | 140     | 70.2  | 171  | 31 |
| 3160                      | MOREX MALT CHECK     | 6     | 30.6   | 70.6  | 69     | 79.9    | 1.6    | 1    | 12.7    | 5.49  | 46.9    | 157     | 68.0  | 160  | 34 |
| Minima                    |                      |       | 32.4   | 75.0  | 30     | 74.7    | 1.7    |      | 12.5    | 5.10  | 36.4    | 93      | 53.5  | 44   | 17 |
| Maxima                    |                      |       | 39.3   | 94.1  | 45     | 80.5    | 2.8    |      | 15.6    | 6.65  | 50.4    | 200     | 95.1  | 320  | 41 |
| Means                     |                      |       | 34.5   | 83.7  | 38     | 78.2    | 2.1    |      | 14.0    | 5.85  | 43.5    | 158     | 74.6  | 177  | 30 |
| Standard Deviations       |                      |       | 1.4    | 4.2   | 3      | 1.4     | 0.2    |      | 0.7     | 0.41  | 3.3     | 28      | 8.8   | 72   | 8  |
| Coefficients of Variation |                      |       | 4.2    | 5.0   | 9      | 1.7     | 11.7   |      | 5.3     | 6.94  | 7.6     | 18      | 11.8  | 41   | 26 |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by K. Smith, University of Minnesota - St. Paul

## 2000 MISSISSIPPI VALLEY REGIONAL NURSERY - BOTTINEAU, ND

Table 5

| Lab No. | Variety or Selection | Rowed | Kernel | on    | Barley | Malt    |            | Barley       | Wort        |             |         | Alpha-     | Beta-           | Quality      | Overall |    |
|---------|----------------------|-------|--------|-------|--------|---------|------------|--------------|-------------|-------------|---------|------------|-----------------|--------------|---------|----|
|         |                      |       | Weight | 6/64" | Color  | Extract | Wort Color | Wort Clarity | Protein (%) | Protein (%) | S/T (%) | DP (°ASBC) | amylase (20°DU) | glucan (ppm) |         |    |
| 3098    | BARBLESS             | 6     | 30.9   | 74.7  | 40     | 77.0    | 2.1        | 1            | 14.1        | 5.27        | 38.2    | 166        | 51.2            | 354          | 27      | 25 |
| 3099    | LARKER               | 6     | 31.1   | 82.2  | 44     | 80.2    | 2.8        | 1            | 12.0        | 5.88        | 50.5    | 119        | 64.3            | 210          | 37      | 9  |
| 3100    | MOREX                | 6     | 29.7   | 73.5  | 45     | 78.8    | 2.0        | 1            | 12.8        | 5.60        | 45.4    | 148        | 67.3            | 258          | 34      | 15 |
| 3101    | ROBUST               | 6     | 30.8   | 75.4  | 45     | 78.7    | 1.6        | 1            | 13.9        | 5.39        | 40.8    | 160        | 50.2            | 426          | 37      | 9  |
| 3102    | STANDER              | 6     | 31.4   | 85.1  | 41     | 79.9    | 3.1        | 1            | 13.1        | 6.38        | 51.2    | 133        | 73.0            | 132          | 34      | 15 |
| 3103    | FOSTER               | 6     | 32.1   | 82.0  | 44     | 78.7    | 2.0        | 1            | 12.9        | 5.34        | 43.8    | 136        | 65.5            | 312          | 33      | 22 |
| 3104    | 6B93-2978            | 6     | 30.7   | 79.7  | 49     | 79.7    | 2.7        | 1            | 12.6        | 6.28        | 50.3    | 142        | 74.8            | 169          | 33      | 22 |
| 3105    | MNBRITE              | 6     | 31.4   | 82.0  | 48     | 78.7    | 4.1        | 1            | 14.7        | 7.42        | 51.6    | 169        | 67.7            | 32           | 19      | 28 |
| 3106    | DRUMMOND             | 6     | 31.3   | 80.2  | 46     | 79.1    | 2.1        | 1            | 13.7        | 5.71        | 43.1    | 147        | 64.1            | 230          | 41      | 3  |
| 3107    | LACEY                | 6     | 32.3   | 82.0  | 44     | 79.4    | 1.8        | 1            | 13.7        | 5.55        | 43.6    | 174        | 79.3            | 259          | 35      | 13 |
| 3108    | 6B94-8253            | 6     | 32.5   | 84.9  | 44     | 78.5    | 2.0        | 1            | 13.7        | 5.48        | 42.0    | 146        | 72.7            | 289          | 39      | 5  |
| 3109    | M103                 | 6     | 32.8   | 84.1  | 41     | 79.7    | 2.6        | 1            | 12.8        | 6.18        | 51.2    | 146        | 65.7            | 71           | 34      | 15 |
| 3110    | M104                 | 6     | 29.4   | 71.5  | 44     | 80.2    | 2.7        | 1            | 13.0        | 6.63        | 51.5    | 145        | 77.9            | 103          | 36      | 12 |
| 3111    | ND16301              | 6     | 32.5   | 87.0  | 47     | 79.7    | 1.8        | 1            | 13.3        | 5.30        | 42.8    | 164        | 71.7            | 181          | 39      | 5  |
| 3112    | 2ND16461             | 2     | *38.3  | 88.1  | 37     | 80.2    | 1.6        | 1            | 12.1        | 4.99        | 43.0    | 99         | 75.2            | 239          | 43      | 2  |
| 3113    | 6B95-2482            | 6     | 30.4   | 76.7  | 48     | 78.9    | 1.4        | 1            | 13.4        | 4.97        | 37.9    | 170        | 67.7            | 239          | 35      | 13 |
| 3114    | 6B96-3733            | 6     | 33.2   | 86.6  | 46     | 80.0    | 1.8        | 1            | 13.4        | 5.83        | 46.1    | 170        | 73.8            | 293          | 34      | 15 |
| 3115    | BT462                | 6     | 31.9   | 80.4  | 40     | 79.8    | 2.1        | 2            | 12.4        | 4.87        | 41.2    | 131        | 64.0            | 279          | 46      | 1  |
| 3116    | M106                 | 6     | 30.1   | 73.7  | 41     | 79.5    | 1.9        | 2            | 13.2        | 5.51        | 44.0    | 152        | 76.7            | 181          | 38      | 7  |
| 3117    | M107                 | 6     | 30.5   | 72.0  | 43     | 80.6    | 3.3        | 1            | 13.2        | 6.32        | 49.7    | 144        | 73.4            | 61           | 34      | 15 |
| 3119    | M108                 | 6     | 32.1   | 82.8  | 40     | 80.4    | 2.9        | 1            | 13.2        | 6.43        | 49.8    | 131        | 74.0            | 55           | 34      | 15 |
| 3120    | ND15422              | 6     | 31.7   | 77.8  | 45     | 79.0    | 1.9        | 1            | 13.2        | 5.44        | 43.1    | 171        | 84.6            | 199          | 34      | 15 |
| 3121    | ND17079              | 6     | 32.4   | 80.6  | 44     | 78.2    | 2.0        | 1            | 14.2        | 5.68        | 41.4    | 178        | 76.0            | 384          | 24      | 26 |
| 3122    | ND17082              | 6     | 31.2   | 81.0  | 43     | 78.8    | 2.0        | 2            | 13.2        | 5.21        | 42.0    | 156        | 71.7            | 439          | 38      | 7  |
| 3123    | ND17190              | 6     | 31.4   | 87.1  | 41     | 77.6    | 3.5        | 1            | 13.2        | 6.57        | 52.0    | 87         | 57.0            | 284          | 23      | 27 |
| 3124    | 2ND17275             | 2     | 36.4   | 88.9  | 42     | 80.2    | 4.4        | 1            | 14.4        | 7.69        | 55.5    | 104        | 69.2            | 35           | 16      | 29 |
| 3125    | 6B95-2089            | 6     | 31.3   | 81.9  | 48     | 79.8    | 1.7        | 1            | 13.4        | 5.13        | 39.0    | 164        | 70.4            | 223          | 37      | 9  |
| 3126    | 6B96-3373            | 6     | 29.9   | 70.9  | 47     | 77.7    | 2.2        | 2            | 14.3        | 5.00        | 36.3    | 180        | 77.7            | 368          | 13      | 30 |
| 3127    | BT470                | 6     | 29.2   | 71.3  | 46     | 80.5    | 3.3        | 1            | 12.7        | 6.40        | 52.9    | 132        | 82.3            | 72           | 29      | 24 |
| 3128    | BT478                | 6     | 29.6   | 73.5  | 46     | 80.7    | 2.6        | 1            | 12.5        | 5.79        | 47.1    | 134        | 62.8            | 119          | 41      | 3  |

Table 5

| Lab No.                   | Variety or Selection | Rowed | Kernel       | on        | Barley   | Malt        | Barley     | Wort         | Alpha-      | Beta-       |                 |                |               |       |    |
|---------------------------|----------------------|-------|--------------|-----------|----------|-------------|------------|--------------|-------------|-------------|-----------------|----------------|---------------|-------|----|
|                           |                      |       | Weight 6/64" | Color (%) | (Agtron) | Extract (%) | Wort Color | Wort Clarity | Protein (%) | Protein (%) | amylase (°ASBC) | glucan (20°DU) | Quality (ppm) | Score |    |
| 3118                      | MOREX MALT CHECK     | 6     | 31.2         | 70.8      | 69       | 80.2        | 1.6        | 1            | 12.9        | 5.51        | 44.7            | 133            | 76.9          | 164   | 39 |
| Minima                    |                      |       | 29.2         | 70.9      | 37       | 77.0        | 1.4        |              | 12.0        | 4.87        | 36.3            | 87             | 50.2          | 32    | 13 |
| Maxima                    |                      |       | 36.4         | 88.9      | 49       | 80.7        | 4.4        |              | 14.7        | 7.69        | 55.5            | 180            | 84.6          | 439   | 46 |
| Means                     |                      |       | 31.4         | 79.9      | 44       | 79.3        | 2.4        |              | 13.3        | 5.81        | 45.6            | 147            | 70.1          | 217   | 33 |
| Standard Deviations       |                      |       | 1.4          | 5.5       | 3        | 0.9         | 0.7        |              | 0.7         | 0.70        | 5.2             | 23             | 8.1           | 116   | 8  |
| Coefficients of Variation |                      |       | 4.6          | 6.8       | 7        | 1.2         | 31.3       |              | 4.9         | 12.06       | 11.3            | 16             | 11.5          | 54    | 23 |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by J. Heward, Busch Ag. Resources Inc., Ft. Collins, CO

## 2000 MISSISSIPPI VALLEY REGIONAL NURSERY - FARGO, ND

Table 6

| Lab No. | Variety or Selection | Rowed    | Kernel | on    | Barley | Malt    | Barley  | Wort    | S/T     | Alpha-  | Beta-   | Overall |       |      |    |    |
|---------|----------------------|----------|--------|-------|--------|---------|---------|---------|---------|---------|---------|---------|-------|------|----|----|
|         |                      |          | Weight | 6/64" | Color  | Extract | Wort    | Protein | Protein | DP      | amylase | glucan  |       |      |    |    |
| (mg)    | (%)                  | (Agtron) | (%)    | (%)   | Color  | Wort    | Clarity | (%)     | (%)     | (°ASBC) | (20°DU) | (ppm)   | Score | Rank |    |    |
| 3161    | BARBLESS             | 6        | 28.2   | 43.3  | 40     | *71.0   | 1.7     | 1       | 14.8    | *4.20   | *28.5   | 168     | 85.2  | *651 | 8  | 30 |
| 3162    | LARKER               | 6        | 28.8   | 44.5  | 45     | 76.2    | 2.0     | 1       | 14.0    | 5.70    | 41.1    | 157     | 73.6  | 136  | 31 | 3  |
| 3163    | MOREX                | 6        | 27.6   | 35.9  | 46     | 76.0    | 2.2     | 1       | 14.2    | 5.87    | 43.6    | 154     | 75.5  | 89   | 24 | 11 |
| 3164    | ROBUST               | 6        | 28.7   | 41.7  | 46     | 77.0    | 1.9     | 1       | 14.4    | 5.88    | 41.3    | 179     | *55.8 | 175  | 19 | 21 |
| 3165    | STANDER              | 6        | 29.1   | 50.7  | 48     | 78.0    | 2.2     | 1       | 13.2    | 6.08    | 48.3    | 148     | 74.4  | 165  | 23 | 16 |
| 3166    | FOSTER               | 6        | 29.2   | 51.4  | 42     | 76.4    | 2.0     | 1       | 12.9    | 5.54    | 43.9    | 150     | 67.6  | 244  | 27 | 10 |
| 3167    | 6B93-2978            | 6        | 26.6   | 29.3  | 60     | 77.7    | 2.1     | 1       | 12.8    | 5.95    | 46.9    | 156     | 85.9  | 240  | 20 | 17 |
| 3168    | MNBRITE              | 6        | 27.7   | 43.7  | 56     | 76.7    | 2.0     | 1       | 14.6    | 6.19    | 44.5    | 193     | 82.3  | 132  | 14 | 26 |
| 3169    | DRUMMOND             | 6        | 28.3   | 46.7  | 55     | 77.4    | 1.9     | 1       | 13.4    | 5.49    | 41.5    | 176     | 71.5  | 141  | 24 | 11 |
| 3170    | LACEY                | 6        | 28.7   | 46.1  | 49     | 77.5    | 2.1     | 1       | 13.8    | 5.83    | 44.2    | 167     | 67.9  | 118  | 28 | 6  |
| 3171    | 6B94-8253            | 6        | 30.7   | 60.0  | 48     | 77.2    | 2.1     | 1       | 13.6    | 5.60    | 43.0    | 154     | 74.1  | 182  | 29 | 5  |
| 3172    | M103                 | 6        | 28.5   | 40.2  | 51     | 77.1    | 2.2     | 1       | 13.6    | 6.07    | 47.3    | 149     | 78.0  | 159  | 19 | 21 |
| 3173    | M104                 | 6        | 25.6   | 24.2  | 46     | 77.1    | 2.3     | 1       | 13.6    | 6.17    | 47.8    | 165     | 83.6  | 126  | 18 | 24 |
| 3174    | ND16301              | 6        | 29.9   | 59.0  | 48     | 78.4    | 2.2     | 1       | 13.0    | 6.01    | 48.5    | 184     | 81.0  | 99   | 20 | 17 |
| 3175    | 2ND16461             | 2        | 32.2   | 42.6  | 48     | 77.7    | 1.9     | 1       | 12.6    | 5.01    | 42.0    | 91      | 78.2  | 341  | 19 | 21 |
| 3176    | 6B95-2482            | 6        | 28.2   | 47.1  | 45     | 78.2    | 2.1     | 1       | 13.6    | 6.04    | 47.2    | 172     | 83.5  | 107  | 20 | 17 |
| 3177    | 6B95-3733            | 6        | 30.6   | 64.0  | 48     | 79.0    | 2.3     | 1       | 12.9    | 6.09    | 49.0    | 151     | 88.5  | 241  | 28 | 6  |
| 3178    | BT462                | 6        | 29.0   | 44.9  | 51     | 77.5    | 2.0     | 1       | 12.4    | 5.12    | 43.7    | 136     | 79.9  | 208  | 33 | 1  |
| 3179    | M106                 | 6        | 28.6   | 42.8  | 50     | 77.8    | 2.1     | 1       | 13.8    | 6.12    | 47.0    | 171     | 85.8  | 70   | 12 | 27 |
| 3180    | M107                 | 6        | 28.8   | 28.9  | 46     | 78.2    | 2.2     | 1       | 13.1    | 6.09    | 48.2    | 167     | 79.3  | 109  | 24 | 11 |
| 3182    | M108                 | 6        | 28.2   | 38.9  | 50     | 78.1    | 2.2     | 1       | 12.9    | 5.94    | 49.4    | 158     | 82.7  | 140  | 30 | 4  |
| 3183    | ND15422              | 6        | 29.1   | 48.5  | 51     | 78.1    | 2.0     | 1       | 13.2    | 5.73    | 45.2    | 181     | 79.4  | 131  | 28 | 6  |
| 3184    | ND17079              | 6        | 29.5   | 56.9  | 44     | 77.6    | 2.1     | 1       | 13.7    | 5.90    | 46.1    | 179     | 76.8  | 276  | 15 | 25 |
| 3185    | ND17082              | 6        | 28.6   | 47.1  | 44     | 77.1    | 2.1     | 1       | 13.3    | 5.68    | 44.7    | 177     | 75.2  | 285  | 20 | 17 |
| 3186    | ND17190              | 6        | 29.2   | 59.0  | 42     | 75.4    | 2.4     | 1       | 13.5    | 6.06    | 48.1    | 104     | 81.7  | 280  | 12 | 27 |
| 3187    | 2ND17275             | 2        | *33.4  | 62.2  | 52     | 78.8    | 1.8     | 1       | 14.0    | 5.90    | 43.8    | 118     | 89.8  | 216  | 24 | 11 |
| 3188    | 6B95-2089            | 6        | 28.1   | 42.5  | 45     | 77.8    | 1.8     | 1       | 13.4    | 5.60    | 44.2    | 198     | 75.5  | 132  | 24 | 11 |
| 3189    | 6B96-3373            | 6        | 28.8   | 48.1  | 44     | 76.9    | 2.0     | 1       | 13.0    | 5.24    | 41.1    | 183     | 83.1  | 115  | 28 | 6  |
| 3190    | BT470                | 6        | 27.7   | 33.9  | 52     | 76.5    | 2.2     | 1       | 13.7    | 6.11    | 47.3    | 182     | 80.1  | 152  | 10 | 29 |
| 3191    | BT478                | 6        | 28.7   | 42.3  | 52     | 78.0    | 1.9     | 1       | 12.4    | 5.46    | 45.7    | 160     | 86.0  | 145  | 33 | 1  |

Table 6

| Lab No.                   | Variety or Selection | Rowed | Kernel | on       | Barley | Malt    | Barley  | Wort    | Alpha- | Beta- |         |         |         |       |    |
|---------------------------|----------------------|-------|--------|----------|--------|---------|---------|---------|--------|-------|---------|---------|---------|-------|----|
|                           |                      |       | Weight | 6/64"    | Color  | Extract | Wort    | Protein | S/T    | DP    | amylase | glucan  | Quality |       |    |
|                           |                      | (mg)  | (%)    | (Agtron) | (%)    | Color   | Clarity | (%)     | (%)    | (%)   | (°ASBC) | (20°DU) | (ppm)   | Score |    |
| 3181                      | MOREX MALT CHECK     | 6     | 30.9   | 70.9     | 72     | 80.0    | 1.6     | 1       | 12.8   | 5.47  | 46.2    | 145     | 73.6    | 124   | 41 |
| Minima                    |                      |       | 25.6   | 24.2     | 40     | 75.4    | 1.7     |         | 12.4   | 5.01  | 41.1    | 91      | 67.6    | 70    | 8  |
| Maxima                    |                      |       | 32.2   | 64.0     | 60     | 79.0    | 2.4     |         | 14.8   | 6.19  | 49.4    | 198     | 89.8    | 341   | 33 |
| Means                     |                      |       | 28.7   | 45.5     | 48     | 77.4    | 2.1     |         | 13.4   | 5.81  | 45.3    | 161     | 79.5    | 171   | 22 |
| Standard Deviations       |                      |       | 1.2    | 9.8      | 4      | 0.8     | 0.2     |         | 0.6    | 0.32  | 2.6     | 24      | 5.7     | 68    | 7  |
| Coefficients of Variation |                      |       | 4.2    | 21.4     | 9      | 1.1     | 7.8     |         | 4.5    | 5.48  | 5.7     | 15      | 7.1     | 40    | 31 |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by R.D. Horsley and J.D. Franckowiak, North Dakota State University - Fargo

## 2000 MISSISSIPPI VALLEY REGIONAL NURSERY AND ADDITIONS- ABERDEEN, ID

Table 7

| Lab No. | Variety or Selection | Rowed | Kernel | on    | Barley | Malt    | Barley     | Wort    | Alpha-      | Beta-       | Quality | Overall    |                 |              |       |      |
|---------|----------------------|-------|--------|-------|--------|---------|------------|---------|-------------|-------------|---------|------------|-----------------|--------------|-------|------|
|         |                      |       | Weight | 6/64" | Color  | Extract | Wort Color | Clarity | Protein (%) | Protein (%) | S/T (%) | DP (°ASBC) | amylase (20°DU) | glucan (ppm) | Score | Rank |
| 3219    | BARBLESS             | 6     | 36.3   | 84.0  | 67     | *74.0   | 1.1        | 1       | 15.1        | 3.95        | 26.7    | 125        | *39.1           | 649          | 12    | 34   |
| 3220    | LARKER               | 6     | 36.7   | 88.2  | 66     | 77.0    | 1.3        | 1       | 14.9        | 4.56        | 31.1    | 172        | 52.2            | 329          | 19    | 33   |
| 3222    | MOREX                | 6     | 37.5   | 91.0  | 69     | 78.7    | 1.2        | 1       | 14.3        | 4.73        | 34.0    | 183        | 58.9            | 369          | 27    | 26   |
| 3223    | ROBUST               | 6     | 38.6   | 93.9  | 67     | 79.4    | 1.1        | 1       | 13.9        | 4.98        | 36.3    | 162        | 52.8            | 374          | 42    | 4    |
| 3224    | STANDER              | 6     | 39.1   | 94.0  | 66     | 80.8    | 1.6        | 1       | 12.9        | 5.36        | 44.5    | 134        | 67.2            | 362          | 39    | 14   |
| 3225    | FOSTER               | 6     | 40.5   | 97.2  | 64     | 80.1    | 1.5        | 1       | 12.5        | 4.93        | 42.8    | 147        | 61.9            | 346          | 46    | 2    |
| 3226    | 6B93-2978            | 6     | 37.2   | 93.4  | 75     | 80.0    | 1.3        | 1       | 13.3        | 4.87        | 38.1    | 176        | 70.1            | 399          | 34    | 21   |
| 3227    | MNBRITE              | 6     | 39.3   | 94.7  | 68     | 78.5    | 1.4        | 1       | 14.4        | 5.24        | 37.8    | 207        | 65.7            | 371          | 23    | 29   |
| 3228    | DRUMMOND             | 6     | 38.8   | 96.5  | 68     | 80.0    | 1.4        | 1       | 14.2        | 5.08        | 37.6    | 174        | 67.9            | 170          | 32    | 22   |
| 3229    | LACEY                | 6     | 39.8   | 95.8  | 65     | 80.1    | 1.4        | 1       | 13.7        | 5.15        | 37.9    | 174        | 63.8            | 135          | 41    | 8    |
| 3230    | 6B94-8253            | 6     | 42.3   | 98.1  | 72     | 78.4    | 1.8        | 1       | 14.0        | 5.38        | 39.1    | 165        | 61.8            | 347          | 23    | 29   |
| 3231    | M103                 | 6     | 41.1   | 97.3  | 69     | 79.8    | 1.5        | 1       | 13.6        | 5.25        | 40.5    | 152        | 58.7            | 232          | 50    | 1    |
| 3232    | M104                 | 6     | 38.7   | 94.3  | 66     | 80.3    | 1.4        | 1       | 13.5        | 5.41        | 40.7    | 171        | 63.7            | 215          | 38    | 16   |
| 3233    | ND16301              | 6     | 41.7   | 97.6  | 73     | 80.2    | 1.5        | 1       | 13.2        | 4.81        | 37.6    | 180        | 56.8            | 181          | 41    | 8    |
| 3234    | 2ND16461             | 2     | 47.9   | 96.6  | 62     | 80.3    | 1.2        | 1       | 12.6        | 4.33        | 35.2    | 99         | 60.2            | 575          | 28    | 25   |
| 3235    | 6B95-2482            | 6     | 41.7   | 97.2  | 71     | 79.7    | 1.2        | 1       | 14.0        | 4.68        | 34.2    | 187        | 55.4            | 308          | 35    | 19   |
| 3236    | 6B96-3733            | 6     | 42.4   | 98.5  | 72     | 81.2    | 1.5        | 1       | 13.5        | 5.64        | 44.8    | 162        | 62.7            | 215          | 42    | 4    |
| 3237    | BT462                | 6     | 42.1   | 96.7  | 75     | 80.5    | 1.8        | 2       | 13.0        | 4.54        | 34.9    | 134        | 54.1            | 242          | 40    | 13   |
| 3238    | M106                 | 6     | 41.6   | 96.6  | 65     | 80.8    | 1.6        | 1       | 13.3        | 5.48        | 42.6    | 164        | 63.5            | 288          | 42    | 4    |
| 3239    | M107                 | 6     | 42.4   | 95.4  | 63     | 81.1    | 1.6        | 1       | 13.2        | 5.52        | 43.9    | 163        | 62.8            | 304          | 39    | 14   |
| 3240    | M108                 | 6     | 40.5   | 96.8  | 63     | 81.3    | 1.6        | 1       | 13.8        | 5.58        | 42.9    | 147        | 64.2            | 248          | 45    | 3    |
| 3241    | ND15422              | 6     | 40.4   | 95.1  | 70     | 79.6    | 1.5        | 1       | 14.3        | 5.09        | 37.7    | 218        | 64.1            | 243          | 29    | 24   |
| 3243    | ND17079              | 6     | 40.8   | 96.4  | 75     | 79.4    | 1.9        | 1       | 14.8        | 5.64        | 39.7    | 185        | 62.7            | 460          | 22    | 31   |
| 3244    | ND17082              | 6     | 39.1   | 95.0  | 72     | 80.3    | 1.7        | 1       | 13.5        | 5.16        | 39.3    | 176        | 58.9            | 347          | 38    | 16   |
| 3245    | ND17190              | 6     | 40.1   | 98.1  | 64     | 79.4    | 2.0        | 1       | 12.5        | 5.77        | 46.9    | 95         | 77.7            | 370          | 27    | 26   |
| 3246    | 2ND17275             | 2     | 47.6   | 98.7  | 64     | 79.5    | 1.8        | 1       | 15.4        | 5.60        | 37.6    | 131        | 74.0            | 501          | 26    | 28   |
| 3247    | 6B95-2089            | 6     | 39.0   | 95.5  | 68     | 80.7    | 1.3        | 1       | 13.5        | 4.65        | 35.8    | 163        | 64.2            | 259          | 41    | 8    |
| 3248    | 6B96-3733            | 6     | 41.3   | 96.6  | 65     | 79.5    | 1.5        | 1       | 14.1        | 4.82        | 36.1    | 184        | 59.1            | 358          | 30    | 23   |
| 3249    | BT470                | 6     | 39.0   | 93.9  | 69     | 81.5    | 1.6        | 1       | 13.1        | 5.36        | 44.4    | 187        | 68.7            | 247          | 38    | 16   |
| 3250    | BT478                | 6     | 36.9   | 86.1  | 62     | 81.1    | 1.3        | 1       | 13.2        | 4.93        | 39.7    | 196        | 66.6            | 147          | 41    | 8    |

Table 7

| Lab No.                   | Variety or Selection | Rowed | Kernel          | on    | Barley            | Malt           | Barley        | Wort            | Alpha-         | Beta-      | Overall       |                    |                 |       |      |    |
|---------------------------|----------------------|-------|-----------------|-------|-------------------|----------------|---------------|-----------------|----------------|------------|---------------|--------------------|-----------------|-------|------|----|
|                           |                      |       | Weight<br>6/64" | (%)   | Color<br>(Agtron) | Extract<br>(%) | Wort<br>Color | Wort<br>Clarity | Protein<br>(%) | S/T<br>(%) | DP<br>(°ASBC) | amylase<br>(20°DU) | glucan<br>(ppm) | Score | Rank |    |
| 3251                      | M101                 | 6     | 41.1            | 94.7  | 71                | 79.6           | 1.5           | 1               | 15.0           | 5.51       | 38.7          | 174                | 65.3            | 327   | 22   | 31 |
| 3252                      | M105                 | 6     | 37.9            | 94.6  | 61                | 79.6           | 1.4           | 1               | 14.0           | 5.25       | 38.3          | 151                | 67.8            | 260   | 41   | 8  |
| 3253                      | B2601                | 6     | 36.5            | *79.0 | 72                | 78.9           | 1.4           | 1               | 13.7           | 4.51       | 35.3          | 147                | 58.3            | 660   | 35   | 19 |
| 3254                      | COLTER               | 6     | 39.8            | 86.3  | 60                | 81.4           | 1.2           | 1               | *11.0          | 3.80       | 37.4          | 111                | 52.5            | 285   | 42   | 4  |
| 3221                      | MOREX MALT CHECK     | 6     | 31.2            | 73.6  | 71                | 80.4           | 1.7           | 1               | 12.3           | 5.53       | 48.5          | 150                | 69.9            | 110   | 46   |    |
| 3242                      | MOREX MALT CHECK     | 6     | 31.0            | 71.0  | 72                | 80.1           | 1.6           | 1               | 12.7           | 5.33       | 44.5          | 151                | 75.7            | 186   | 42   |    |
| Minima                    |                      |       | 36.3            | 84.0  | 60                | 77.0           | 1.1           |                 | 12.5           | 3.80       | 26.7          | 95                 | 52.2            | 135   | 12   |    |
| Maxima                    |                      |       | 47.9            | 98.7  | 75                | 81.5           | 2.0           |                 | 15.4           | 5.77       | 46.9          | 218                | 77.7            | 660   | 50   |    |
| Means                     |                      |       | 40.2            | 94.7  | 68                | 80.0           | 1.5           |                 | 13.8           | 5.05       | 38.5          | 162                | 62.6            | 327   | 34   |    |
| Standard Deviations       |                      |       | 2.6             | 3.7   | 4                 | 1.0            | 0.2           |                 | 0.7            | 0.48       | 4.2           | 28                 | 5.9             | 127   | 9    |    |
| Coefficients of Variation |                      |       | 6.5             | 3.9   | 6                 | 1.2            | 14.7          |                 | 5.3            | 9.55       | 10.8          | 18                 | 9.4             | 39    | 26   |    |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by D. Wesenberg, USDA/ARS, Aberdeen, ID

## MISSISSIPPI VALLEY UNIFORM BARLEY NURSERY - 2000 Crop

Table 8 - Station Means\* of Barley and Malt Quality Factors for 30 Varieties or Selections\*\*.

| Location      | Barley                   |                           |                             |                        |                      |                          |                        |     |           |                               |                          |    | Ave.<br>Quality<br>Score |   |      |   |     |    |      |   |     |   |    |
|---------------|--------------------------|---------------------------|-----------------------------|------------------------|----------------------|--------------------------|------------------------|-----|-----------|-------------------------------|--------------------------|----|--------------------------|---|------|---|-----|----|------|---|-----|---|----|
|               | Kernel<br>Weight<br>(mg) | Barley<br>on 6/64"<br>(%) | Barley<br>Color<br>(Agtron) | Malt<br>Extract<br>(%) | Wort<br>Color<br>(%) | Barley<br>Protein<br>(%) | Wort<br>Protein<br>(%) | S/T | DP<br>(°) | Alpha-<br>amylase<br>(20° DU) | Beta-<br>glucan<br>(ppm) |    |                          |   |      |   |     |    |      |   |     |   |    |
|               |                          |                           |                             |                        |                      |                          |                        |     |           |                               |                          |    |                          |   |      |   |     |    |      |   |     |   |    |
| Aberdeen, ID  | 40.3                     | A                         | 95.0                        | A                      | 68                   | A                        | 79.8                   | A   | 1.5       | A                             | 13.7                     | BC | 5.08                     | A | 38.7 | B | 164 | B  | 62.0 | A | 320 | B | 34 |
| Morris, MN    | 34.8                     | B                         | 83.2                        | B                      | 38                   | D                        | 78.2                   | B   | 2.1       | B                             | 14.0                     | C  | 5.85                     | B | 43.5 | A | 158 | AB | 74.6 | C | 186 | A | 30 |
| Bottineau, ND | 31.6                     | C                         | 79.9                        | B                      | 44                   | C                        | 79.3                   | A   | 2.4       | C                             | 13.3                     | A  | 5.81                     | B | 45.6 | A | 147 | A  | 70.1 | B | 217 | A | 33 |
| Fargo, ND     | 28.9                     | D                         | 45.5                        | C                      | 48                   | B                        | 77.2                   | C   | 2.1       | B                             | 13.4                     | AB | 5.76                     | B | 44.8 | A | 161 | B  | 78.7 | D | 187 | A | 22 |

\* Within each column, means followed by the same letter are not significantly different (alpha=0.05), according to Duncan's Multiple Range test

\*\* Barbless, Larker, Morex, Robust, Stander, Foster, 6B93-2978, MNBrite, Drummond, Lacey, 6B94-8253, M103, M104, ND16301  
2ND16461, 6B95-2482, 6B96-3733, BT462, M106, M107, M108, ND15422, ND17079, ND17082, ND17190, 2ND17275,  
6B95-2089, 6B96-3373, BT470, BT478

### MISSISSIPPI VALLEY UNIFORM BARLEY NURSERY - 2000 Crop

Table 9 - Varietal Means\* of Barley and Malt Quality Factors for 4 Stations\*\*.

| Variety   | Rowed | Barley             |             |                       |                  | Wort Color | Barley Protein (%) | Wort Protein (%) | S/T (%)     | DP (°)      | Alpha-amylase (20° DU) | Beta-glucan (ppm) | Ave. Quality Score | Overall Rank |
|-----------|-------|--------------------|-------------|-----------------------|------------------|------------|--------------------|------------------|-------------|-------------|------------------------|-------------------|--------------------|--------------|
|           |       | Kernel Weight (mg) | on 6/64 (%) | Barley Color (Agrton) | Malt Extract (%) |            |                    |                  |             |             |                        |                   |                    |              |
| BARBLESS  | 6     | 32.3               | A           | 67.5 A                | 47 A             | 74.2 D     | 1.7 A              | 14.9 J           | 4.71 A      | 32.5 G      | 153 DEFG               | 58.0 AB           | 494 F              | 17 30        |
| LARKER    | 6     | 32.8               | A           | 73.8 A                | 47 A             | 77.4 BC    | 2.0 AB             | 14.1 EFGHIJ      | 5.43 ABCDE  | 40.2 CDEF   | 156 CDEFG              | 62.9 ABC          | 232 ABCDE          | 26 24        |
| MOREX     | 6     | 32.0               | A           | 68.9 A                | 50 A             | 77.9 ABC   | 1.9 AB             | 14.0 DEFGHI      | 5.62 BCDEFG | 41.6 BCDEF  | 165 BCDEF              | 70.6 BCD          | 220 ABCDE          | 27 22        |
| ROBUST    | 6     | 33.1               | A           | 72.9 A                | 49 A             | 78.4 ABC   | 1.7 A              | 14.2 FGHIJ       | 5.52 ABCDEF | 39.9 EF     | 165 BCDEF              | 53.1 A            | 320 CDE            | 34 7         |
| STANDER   | 6     | 33.7               | A           | 78.7 A                | 48 A             | 79.5 AB    | 2.4 AB             | 13.2 ABCDE       | 6.02 DEFG   | 48.2 AB     | 141 FG                 | 73.9 BCD          | 210 ABCDE          | 33 11        |
| FOSTER    | 6     | 34.3               | A           | 79.2 A                | 47 A             | 78.2 ABC   | 1.9 AB             | 12.8 AB          | 5.34 ABCD   | 43.6 ABCDEF | 144 EFG                | 65.6 ABCD         | 297 ABCDE          | 35 3         |
| 6B93-2978 | 6     | 31.7               | A           | 70.5 A                | 54 A             | 78.9 ABC   | 2.1 AB             | 13.2 ABCDE       | 5.87 DEFG   | 45.5 ABCDEF | 159 BCDEFG             | 77.0 CD           | 315 CDE            | 27 22        |
| MNBRITE   | 6     | 33.2               | A           | 76.5 A                | 54 A             | 78.1 ABC   | 2.4 AB             | 14.6 HIJ         | 6.30 FG     | 44.7 ABCDEF | 192 A                  | 73.6 BCD          | 172 ABCDE          | 20 28        |
| DRUMMOND  | 6     | 32.9               | A           | 76.0 A                | 52 A             | 78.7 ABC   | 1.8 AB             | 13.7 BCDEFGH     | 5.43 ABCDE  | 41.3 BCDEF  | 165 BCDEF              | 72.6 BCD          | 171 ABCDE          | 34 7         |
| LACEY     | 6     | 33.8               | A           | 77.4 A                | 50 A             | 79.0 ABC   | 1.8 AB             | 13.7 BCDEFGH     | 5.43 ABCDE  | 41.4 BCDEF  | 167 ABCDE              | 69.9 BCD          | 172                | 36 2         |
| 6B94-8253 | 6     | 35.4               | A           | 81.5 A                | 50 A             | 77.8 ABC   | 2.0 AB             | 13.8 CDEFGHI     | 5.45 ABCDE  | 41.0 CDEF   | 156 CDEFG              | 68.0 BCD          | 251 ABCDE          | 32 12        |
| M103      | 6     | 34.9               | A           | 77.3 A                | 50 A             | 78.7 ABC   | 2.2 AB             | 13.6 BCDEFG      | 6.04 DEFG   | 46.6 ABCDE  | 153 DEFG               | 71.4 BCD          | 127 A              | 32 12        |
| M104      | 6     | 31.9               | A           | 68.5 A                | 50 A             | 79.3 AB    | 2.1 AB             | 13.4 BCDEF       | 6.01 DEFG   | 46.3 ABCDEF | 155 CDEFG              | 76.7 CD           | 188 ABCDE          | 32 12        |
| ND16301   | 6     | 34.6               | A           | 82.1 A                | 52 A             | 79.3 AB    | 1.9 AB             | 13.3 ABCDE       | 5.44 ABCDE  | 43.2 ABCDEF | 178 ABCD               | 71.6 BCD          | 147 ABC            | 35 3         |
| 2ND16461  | 2     | 39.9               | A           | 78.5 A                | 45 A             | 79.4 AB    | 1.6 A              | 12.5 A           | 4.88 AB     | 40.5 CDEF   | 96 I                   | 72.5 BCD          | 341 E              | 32 12        |
| 6B95-2482 | 6     | 34.0               | A           | 77.5 A                | 50 A             | 79.2 ABC   | 1.6 A              | 13.8 BCDEFGHI    | 5.33 ABCD   | 40.0 DEF    | 182 AB                 | 69.6 BCD          | 197 ABCDE          | 31 19        |
| 6B96-3733 | 6     | 35.6               | A           | 84.6 A                | 51 A             | 80.2 A     | 1.9 AB             | 13.2 ABCDE       | 5.88 DEFG   | 47.1 ABC    | 162 BCDEF              | 77.4 CD           | 230 ABCDE          | 32 12        |
| BT462     | 6     | 34.5               | A           | 75.7 A                | 50 A             | 78.9 ABC   | 2.0 AB             | 13.0 ABC         | 4.96 ABC    | 39.4 F      | 135 GH                 | 67.4 ABCD         | 236 ABCDE          | 35 3         |
| M106      | 6     | 33.8               | A           | 74.3 A                | 49 A             | 79.3 AB    | 1.9 AB             | 13.7 BCDEFGH     | 5.77 CDEFG  | 44.4 ABCDEF | 163 BCDEF              | 75.8 CD           | 159 ABCD           | 32 12        |
| M107      | 6     | 34.5               | A           | 69.1 A                | 48 A             | 80.0 A     | 2.3 AB             | 13.2 ABCDE       | 5.97 DEFG   | 47.1 ABCD   | 159 BCDEFG             | 72.5 BCD          | 144 ABC            | 35 3         |
| M108      | 6     | 33.9               | A           | 75.7 A                | 48 A             | 79.8 A     | 2.2 AB             | 13.2 ABCDE       | 5.92 DEFG   | 47.2 ABC    | 144 EFG                | 73.9 BCD          | 141 ABC            | 38 1         |
| ND15422   | 6     | 33.8               | A           | 74.7 A                | 52 A             | 78.4 ABC   | 1.9 AB             | 13.7 BCDEFGH     | 5.53 ABCDEF | 41.9 BCDEF  | 192 A                  | 77.2 CD           | 171 ABCDE          | 30 20        |
| ND17079   | 6     | 34.4               | A           | 80.7 A                | 51 A             | 78.2 ABC   | 2.0 AB             | 14.4 GHJ         | 5.81 DEFG   | 42.2 BCDEF  | 184 AB                 | 72.9 BCD          | 333 DE             | 20 28        |
| ND17082   | 6     | —                  | A           | 77.0 A                | 50 A             | 78.4 ABC   | 2.0 AB             | 13.5 BCDEFG      | 5.42 ABCDE  | 42.3 ABCDE  | 169 ABCDE              | 70.3 BCD          | 310 BCDE           | 32 12        |
| ND17190   | 6     | 33.5               | A           | 82.6 A                | 46 A             | 76.9 C     | 2.7 B              | 13.2 ABCDE       | 6.23 EFG    | 49.4 A      | 102 I                  | 72.7 BCD          | 285 ABCDE          | 21 27        |
| 2ND17275  | 2     | 39.2               | A           | 83.6 A                | 50 A             | 79.5 AB    | 2.5 AB             | 14.7 IJ          | 6.40 G      | 45.6 ABCDEF | 115 HI                 | 82.0 D            | 253 ABCDE          | 22 26        |
| 6B95-2089 | 6     | 32.9               | A           | 75.7 A                | 49 A             | 79.2 AB    | 1.7 A              | 13.5 BCDEFG      | 5.26 ABCD   | 40.5 CDEF   | 179 ABC                | 71.9 BCD          | 172 ABCDE          | 34 7         |
| 6B96-3373 | 6     | 33.2               | A           | 74.3 A                | 49 A             | 78.0 ABC   | 2.0 AB             | 13.9 CDEFGHI     | 5.25 ABCD   | 39.3 F      | 180 ABC                | 74.2 BCD          | 245 ABCDE          | 25 25        |
| BT470     | 6     | 32.4               | A           | 73.3 A                | 52 A             | 79.4 AB    | 2.3 AB             | 13.4 ABCDEF      | 5.96 DEFG   | 47.1 ABCD   | 168 ABCDE              | 74.4 CD           | 157 ABCD           | 29 21        |
| BT478     | 6     | 32.2               | A           | 69.5 A                | 50 A             | 79.5 AB    | 2.1 AB             | 13.1 ABCD        | 5.57 BCDEFG | 44.2 ABCDEF | 149 EFG                | 71.3 BCD          | 131 AB             | 34 7         |

\* Within each column, means followed by the same letter are not significantly different ( $\alpha=0.05$ ), according to Duncan's Multiple Range test.

\*\* Aberdeen, ID, Morris, MN, Bottineau and Fargo, ND

## 2000 MALTING BARLEYS, NITROGEN APPLICATION STUDY - PRESQUE ISLE, ME

Table 10

| Lab No. | Variety or Selection | Rowed | Kernel Weight (mg) | on 6/64" | Barley Color (Agtron) | Malt Extract (%) | Wort Color | Wort Clarity | Barley Protein (%) | Wort Protein (%) | S/T (%) | DP (°ASBC) | Alpha-amylase (20°DU) | Beta-glucan (ppm) | Quality Score | Overall Rank |
|---------|----------------------|-------|--------------------|----------|-----------------------|------------------|------------|--------------|--------------------|------------------|---------|------------|-----------------------|-------------------|---------------|--------------|
| 2019    | B1602-60             | 6     | 36.7               | 90.3     | 31                    | 80.5             | 1.7        | 1            | 10.7               | 4.96             | 48.7    | 126        | 64.8                  | 332               | 39            | 1            |
| 2020    | EXCEL-60             | 6     | 38.1               | 92.6     | 30                    | 80.8             | 2.2        | 1            | 10.7               | 5.63             | 55.4    | 110        | 67.3                  | 373               | 35            | 14           |
| 2021    | STANDER-60           | 6     | 38.0               | 94.9     | 36                    | 82.1             | 2.4        | 1            | 10.8               | 5.82             | 58.4    | 111        | 83.2                  | 303               | 35            | 14           |
| 2022    | B2978-60             | 6     | 36.8               | 93.5     | 33                    | 81.2             | 2.3        | 1            | 10.3               | 5.56             | 58.7    | 116        | 78.1                  | 304               | 30            | 31           |
| 2023    | STANDER-120          | 6     | 37.2               | 93.1     | 27                    | 80.9             | 2.5        | 1            | 12.8               | 6.57             | 54.7    | 139        | 86.3                  | 426               | 31            | 29           |
| 2024    | B2978-120            | 6     | 33.3               | 85.4     | 34                    | 80.5             | 2.2        | 1            | 12.2               | 6.35             | 55.6    | 148        | 93.5                  | 337               | 39            | 1            |
| 2025    | B1602-120            | 6     | 34.1               | 84.9     | 33                    | 79.8             | 1.8        | 1            | 12.4               | 5.60             | 48.3    | 153        | 72.6                  | 376               | 39            | 1            |
| 2026    | EXCEL-120            | 6     | 36.1               | 85.6     | 30                    | 80.7             | 2.2        | 1            | 12.1               | 6.32             | 53.0    | 137        | 68.6                  | 467               | 36            | 12           |
| 2027    | EXCEL-90             | 6     | 37.3               | 89.7     | 29                    | 80.7             | 2.1        | 1            | 10.6               | 5.62             | 57.0    | 111        | 64.3                  | 353               | 35            | 14           |
| 2028    | B2978-90             | 6     | 35.0               | 88.3     | 36                    | 81.0             | 2.3        | 1            | 11.0               | 6.07             | 58.2    | 134        | 77.3                  | 272               | 39            | 1            |
| 2029    | B1602-90             | 6     | 35.1               | 86.3     | 36                    | 79.9             | 1.7        | 1            | 10.8               | 5.15             | 48.0    | 129        | 60.8                  | 451               | 36            | 12           |
| 2030    | STANDER-90           | 6     | 36.6               | 92.1     | 33                    | 81.1             | 2.5        | 1            | 11.6               | 6.28             | 54.3    | 129        | 76.1                  | 453               | 32            | 27           |
| 2031    | EXCEL-30             | 6     | 38.0               | 92.1     | 32                    | 80.9             | 2.1        | 1            | 10.5               | 5.56             | 56.1    | 116        | 65.9                  | 358               | 30            | 31           |
| 2032    | B2978-30             | 6     | 36.0               | 90.9     | 35                    | 80.8             | 2.1        | 1            | 10.2               | 5.59             | 56.3    | 117        | 75.4                  | 367               | 30            | 31           |
| 2033    | STANDER-30           | 6     | 39.3               | 96.5     | 33                    | 82.0             | 2.5        | 1            | 11.0               | 5.82             | 57.8    | 116        | 79.3                  | 347               | 35            | 14           |
| 2034    | B1602-30             | 6     | 38.7               | 94.6     | 35                    | 80.9             | 1.7        | 1            | 10.7               | 4.98             | 49.4    | 122        | 60.7                  | 394               | 39            | 1            |
| 2035    | MERIT-60             | 2     | 32.7               | 69.6     | 32                    | 81.3             | 3.6        | 1            | 10.6               | 5.97             | 59.5    | 112        | 97.6                  | 210               | 35            | 14           |
| 2036    | B2978-30             | 6     | 35.4               | 94.5     | 36                    | 81.1             | 2.2        | 1            | 10.1               | 5.47             | 59.7    | 115        | 75.8                  | 271               | 33            | 22           |
| 2037    | STANDER-30           | 6     | 38.1               | 95.5     | 31                    | 81.8             | 2.3        | 1            | 10.1               | 5.51             | 56.7    | 106        | 76.2                  | 275               | 33            | 22           |
| 2038    | EXCEL-30             | 6     | 36.6               | 95.3     | 35                    | 81.4             | 2.1        | 1            | 10.4               | 5.22             | 54.9    | 102        | 65.1                  | 380               | 34            | 21           |
| 2040    | B1602-30             | 6     | 37.2               | 93.9     | 38                    | 80.7             | 1.6        | 1            | 10.0               | 4.79             | 49.1    | 121        | 61.0                  | 268               | 37            | 11           |
| 2041    | STANDER-90           | 6     | 35.3               | 89.8     | 32                    | 82.0             | 2.4        | 1            | 11.9               | 6.08             | 55.1    | 121        | 75.9                  | 406               | 32            | 24           |
| 2042    | EXCEL-90             | 6     | 35.8               | 86.8     | 28                    | 80.6             | 2.2        | 1            | 12.5               | 6.09             | 52.8    | 137        | 67.5                  | 419               | 31            | 26           |
| 2043    | B1602-90             | 6     | 34.1               | 82.7     | 36                    | 79.9             | 1.7        | 1            | 12.3               | 5.41             | 47.2    | 144        | 78.7                  | 410               | 39            | 1            |
| 2044    | B2978-90             | 6     | 35.1               | 90.2     | 32                    | 81.0             | 2.4        | 1            | 12.0               | 6.38             | 53.3    | 144        | 74.6                  | 349               | 39            | 1            |
| 2045    | B1602-60             | 6     | 36.4               | 90.6     | 34                    | 80.5             | 1.6        | 1            | 10.7               | 4.86             | 46.7    | 122        | 63.2                  | 405               | 39            | 1            |
| 2046    | B2978-60             | 6     | 35.9               | 92.4     | 32                    | 81.8             | 2.3        | 1            | 11.4               | 6.03             | 54.9    | 125        | 80.7                  | 255               | 35            | 14           |
| 2047    | EXCEL-60             | 6     | 37.2               | 93.0     | 30                    | 81.1             | 2.2        | 1            | 10.9               | 5.50             | 53.4    | 111        | 66.7                  | 345               | 35            | 14           |
| 2048    | STANDER-60           | 6     | 36.9               | 93.1     | 33                    | 81.3             | 2.4        | 1            | 11.5               | 5.93             | 55.2    | 118        | 78.2                  | 284               | 38            | 10           |
| 2049    | B1602-120            | 6     | 36.2               | 86.5     | 31                    | 79.1             | 1.6        | 1            | 13.1               | 5.32             | 43.2    | 151        | 60.2                  | 467               | 39            | 1            |

Table 10

| Lab No.                   | Variety or Selection | Rowed | Kernel         | on           | Barley            | Malt           |               | Barley          | Wort           |                |            | Alpha-        | Beta-              | Quality         | Overall |    |
|---------------------------|----------------------|-------|----------------|--------------|-------------------|----------------|---------------|-----------------|----------------|----------------|------------|---------------|--------------------|-----------------|---------|----|
|                           |                      |       | Weight<br>(mg) | 6/64"<br>(%) | Color<br>(Agtron) | Extract<br>(%) | Wort<br>Color | Wort<br>Clarity | Protein<br>(%) | Protein<br>(%) | S/T<br>(%) | DP<br>(°ASBC) | amylase<br>(20°DU) | glucan<br>(ppm) |         |    |
| 2050                      | STANDER-120          | 6     | 35.6           | 88.8         | 30                | 80.8           | 2.6           | 1               | 13.2           | 6.59           | 51.7       | 148           | 81.5               | 385             | 34      | 21 |
| 2051                      | B2978-120            | 6     | 35.4           | 87.9         | 30                | 80.2           | 2.3           | 1               | 13.1           | 6.39           | 50.2       | 157           | 77.3               | 373             | 34      | 21 |
| 2052                      | EXCEL-120            | 6     | 36.3           | 87.5         | 28                | 80.0           | 2.2           | 1               | 13.1           | 6.24           | 51.4       | 145           | 65.3               | 429             | 34      | 21 |
| 2053                      | MERIT-60             | 2     | 31.0           | *60.4        | 29                | 81.1           | *3.7          | 1               | 11.0           | 6.30           | 57.8       | 140           | *115.8             | 173             | 29      | 34 |
| 2039                      | MOREX MALT CHECK     | 6     | 31.3           | 70.9         | 71                | 79.6           | 1.7           | 1               | 12.3           | 5.57           | 48.2       | 144           | 67.2               | 86              | 43      |    |
| Minima                    |                      |       | 31.0           | 69.6         | 27                | 79.1           | 1.6           |                 | 10.0           | 4.79           | 43.2       | 102           | 60.2               | 173             | 29      |    |
| Maxima                    |                      |       | 39.3           | 96.5         | 38                | 82.1           | 3.6           |                 | 13.2           | 6.59           | 59.7       | 157           | 97.6               | 467             | 39      |    |
| Means                     |                      |       | 36.1           | 90.0         | 32                | 80.9           | 2.2           |                 | 11.4           | 5.76           | 53.6       | 127           | 73.3               | 353             | 35      |    |
| Standard Deviations       |                      |       | 1.7            | 5.1          | 3                 | 0.7            | 0.4           |                 | 1.0            | 0.50           | 4.1        | 15            | 9.3                | 73              | 3       |    |
| Coefficients of Variation |                      |       | 4.8            | 5.7          | 9                 | 0.8            | 18.2          |                 | 8.7            | 8.75           | 7.7        | 12            | 12.7               | 21              | 9       |    |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by G. Porter, University of Maine - Presque Isle

## 2000 ADVANCED LINES (GROUP 1) - ST. PAUL AND CROOKSTON, MN

Table 11

| Lab No. | Variety or Selection | Location | Rowed | Kernel         | on           | Barley            | Malt           |               | Barley          | Wort           | S/T            | Alpha-        | Beta-              | Quality         | Overall |    |    |
|---------|----------------------|----------|-------|----------------|--------------|-------------------|----------------|---------------|-----------------|----------------|----------------|---------------|--------------------|-----------------|---------|----|----|
|         |                      |          |       | Weight<br>(mg) | 6/64"<br>(%) | Color<br>(Agtron) | Extract<br>(%) | Wort<br>Color | Wort<br>Clarity | Protein<br>(%) | Protein<br>(%) | DP<br>(°ASBC) | amylase<br>(20°DU) | glucan<br>(ppm) |         |    |    |
| 202     | MOREX                | St. P.   | 6     | 31.4           | *66.9        | 63                | 77.9           | 1.8           | 1               | 12.4           | 5.78           | 48.7          | 160                | 56.6            | 119     | 37 | 22 |
| 203     | ROBUST               | St. P.   | 6     | 32.6           | 78.1         | 60                | 78.9           | 1.6           | 1               | 11.9           | 5.61           | 49.1          | 149                | 45.5            | 223     | 46 | 6  |
| 204     | STANDER              | St. P.   | 6     | 32.7           | 83.3         | 64                | 80.7           | 2.3           | 1               | 11.2           | 6.25           | 58.3          | 126                | 66.2            | 145     | 39 | 15 |
| 205     | LACEY                | St. P.   | 6     | 33.9           | 84.8         | 63                | 79.2           | 1.7           | 2               | 10.9           | 5.48           | 52.7          | 156                | 52.8            | 76      | 48 | 4  |
| 206     | M103                 | St. P.   | 6     | 34.5           | 84.3         | 60                | 79.8           | 2.0           | 1               | 11.3           | 6.11           | 57.8          | 135                | 59.0            | 78      | 40 | 14 |
| 207     | M104                 | St. P.   | 6     | 32.1           | 80.5         | 58                | 80.1           | 2.2           | 1               | 11.3           | 6.19           | 57.5          | 122                | 67.3            | 159     | 35 | 25 |
| 208     | M106                 | St. P.   | 6     | 34.0           | 83.8         | 58                | 79.3           | n.d.          | 3               | 11.7           | 5.79           | 52.5          | 146                | 55.6            | 110     | 48 | 4  |
| 209     | M107                 | St. P.   | 6     | 34.5           | 77.3         | 62                | 79.9           | 2.4           | 2               | 11.2           | 5.98           | 56.8          | 128                | 61.9            | 78      | 34 | 29 |
| 210     | M108                 | St. P.   | 6     | 33.3           | 80.7         | 62                | 80.2           | 2.4           | 1               | 11.3           | 6.23           | 58.1          | 118                | 64.1            | 101     | 39 | 15 |
| 211     | M94-33               | St. P.   | 6     | 33.9           | 82.4         | 61                | 80.2           | 2.3           | 1               | 11.3           | 6.42           | 59.7          | 129                | 65.7            | 151     | 35 | 25 |
| 212     | M95-52               | St. P.   | 6     | 33.5           | 81.3         | 59                | 80.6           | 2.2           | 1               | 11.7           | 6.32           | 56.4          | 123                | 54.7            | 138     | 46 | 6  |
| 213     | M95-91               | St. P.   | 6     | 35.8           | 82.6         | 60                | 79.4           | n.d.          | 3               | 11.7           | 5.73           | 52.3          | 149                | 52.2            | 135     | 51 | 3  |
| 214     | M95-106              | St. P.   | 6     | 33.0           | 82.5         | 57                | 80.0           | 2.5           | 1               | 12.1           | 6.43           | 55.6          | 127                | 71.1            | 139     | 39 | 15 |
| 215     | M96-203              | St. P.   | 6     | 31.7           | 79.3         | 55                | 79.7           | 2.2           | 2               | 11.1           | 5.27           | 50.8          | 125                | 57.3            | 214     | 41 | 12 |
| 216     | M96-77               | St. P.   | 6     | 34.5           | 84.3         | 62                | 79.5           | 1.9           | 2               | 11.2           | 5.03           | 48.0          | 134                | 56.1            | 68      | 46 | 6  |
| 217     | M96-80               | St. P.   | 6     | 33.1           | 78.7         | 58                | 80.5           | 1.9           | 2               | 10.7           | 5.36           | 53.9          | 143                | 55.7            | 112     | 52 | 1  |
| 218     | M96-177              | St. P.   | 6     | 31.5           | 76.4         | 55                | 78.5           | 2.1           | 2               | 11.3           | 5.10           | 48.3          | 132                | 51.0            | 228     | 43 | 10 |
| 219     | M96-191              | St. P.   | 6     | 33.5           | 81.8         | 52                | 79.8           | 2.1           | 2               | 11.2           | 5.30           | 50.5          | 141                | 49.2            | 205     | 52 | 1  |
| 220     | M96-100              | St. P.   | 6     | 32.4           | 84.1         | 56                | 78.6           | 2.0           | 2               | 11.5           | 5.40           | 48.4          | 132                | 53.8            | 254     | 42 | 11 |
| 221     | M96-103              | St. P.   | 6     | 32.7           | 79.1         | 62                | 78.8           | 2.0           | 1               | 11.3           | 5.63           | 51.9          | 116                | 55.5            | 198     | 36 | 24 |
| 223     | M96-105              | St. P.   | 6     | 33.3           | 76.1         | 60                | 79.4           | 2.1           | 1               | 11.6           | 5.98           | 54.6          | 123                | 63.4            | 170     | 33 | 30 |
| 224     | M96-141              | St. P.   | 6     | 33.0           | 81.7         | 63                | 80.3           | 1.8           | 1               | 11.4           | 5.63           | 51.7          | 136                | 62.1            | 141     | 46 | 6  |
| 225     | M96-142              | St. P.   | 6     | 33.0           | 81.9         | 58                | 79.8           | 2.0           | 1               | 11.7           | 5.84           | 53.0          | 115                | 69.2            | 148     | 39 | 15 |
| 226     | FEGA4-66             | St. P.   | 6     | 31.4           | 81.3         | 67                | 79.6           | 1.8           | 1               | 13.2           | 6.93           | 54.3          | 179                | 74.1            | 70      | 26 | 37 |
| 227     | MOREX                | Crkstn   | 6     | 29.6           | *60.2        | 37                | 75.3           | 2.4           | 1               | 14.4           | 6.04           | 43.1          | 174                | 64.2            | 185     | 12 | 48 |
| 228     | ROBUST               | Crkstn   | 6     | 32.2           | 78.4         | 39                | 76.4           | 2.0           | 1               | 13.4           | 5.70           | 44.2          | 161                | 49.9            | 284     | 39 | 15 |
| 229     | STANDER              | Crkstn   | 6     | 33.7           | 80.4         | 34                | 77.9           | 2.8           | 1               | 13.4           | 6.70           | 51.8          | 134                | 72.7            | 313     | 21 | 43 |
| 230     | LACEY                | Crkstn   | 6     | 33.2           | 80.0         | 40                | 77.3           | 2.1           | 1               | 12.7           | 5.50           | 43.9          | 153                | 56.7            | 191     | 39 | 15 |
| 231     | M103                 | Crkstn   | 6     | 33.6           | 76.3         | 36                | 76.0           | 2.8           | 1               | 14.0           | 6.47           | 45.5          | 140                | 69.5            | 261     | 27 | 35 |
| 232     | M104                 | Crkstn   | 6     | 30.6           | 73.0         | 38                | 77.3           | 2.5           | 1               | 13.1           | 6.29           | 49.1          | 127                | 69.8            | 329     | 14 | 47 |

Table 11

| Lab No.                   | Variety or Selection | Location | Rowed | Kernel         | on    | Barley       | Malt           | Barley        | Wort            | Alpha-         | Beta-          | Quality | Overall |      |     |    |    |
|---------------------------|----------------------|----------|-------|----------------|-------|--------------|----------------|---------------|-----------------|----------------|----------------|---------|---------|------|-----|----|----|
|                           |                      |          |       | Weight<br>(mg) | 6/64" | Color<br>(%) | Extract<br>(%) | Wort<br>Color | Wort<br>Clarity | Protein<br>(%) | Protein<br>(%) |         |         |      |     |    |    |
| 233                       | M106                 | Crkstn   | 6     | 33.1           | 80.6  | 38           | 77.2           | 2.5           | 1               | 13.4           | 6.04           | 45.7    | 152     | 60.5 | 199 | 32 | 31 |
| 234                       | M107                 | Crkstn   | 6     | 34.1           | *70.1 | 43           | 77.8           | 3.1           | 1               | 12.8           | 6.35           | 50.1    | 149     | 68.0 | 208 | 25 | 38 |
| 235                       | M108                 | Crkstn   | 6     | 34.2           | 82.4  | 42           | 77.4           | 3.0           | 1               | 12.3           | 6.04           | 48.1    | 124     | 63.9 | 217 | 25 | 38 |
| 236                       | M94-33               | Crkstn   | 6     | 34.5           | 82.6  | 43           | 77.8           | 3.2           | 1               | 13.3           | 6.51           | 51.4    | 135     | 65.5 | 295 | 24 | 41 |
| 237                       | M95-52               | Crkstn   | 6     | 34.9           | 81.8  | 41           | 77.9           | 2.8           | 1               | 12.9           | 6.11           | 48.2    | 130     | 75.4 | 257 | 20 | 45 |
| 238                       | M95-91               | Crkstn   | 6     | 36.6           | 80.1  | 36           | 77.1           | 3.3           | 1               | 12.9           | 5.87           | 46.1    | 148     | 66.1 | 306 | 27 | 35 |
| 239                       | M95-106              | Crkstn   | 6     | 33.8           | 80.2  | 37           | 77.7           | 3.2           | 1               | 13.7           | 6.82           | 51.7    | 137     | 90.8 | 282 | 24 | 41 |
| 240                       | M96-203              | Crkstn   | 6     | 33.1           | 76.5  | 38           | 77.2           | 3.3           | 2               | 13.4           | 6.51           | 49.6    | 152     | 55.5 | 421 | 25 | 38 |
| 241                       | M96-77               | Crkstn   | 6     | 34.5           | 82.1  | 42           | 76.7           | 2.7           | 2               | 12.4           | 5.33           | 44.2    | 146     | 66.4 | 152 | 39 | 15 |
| 243                       | M96-80               | Crkstn   | 6     | 33.3           | 76.2  | 38           | 77.2           | 2.4           | 1               | 13.6           | 5.68           | 43.4    | 154     | 57.6 | 246 | 37 | 22 |
| 244                       | M96-177              | Crkstn   | 6     | 33.6           | 78.7  | 35           | 76.2           | 2.9           | 2               | 13.2           | 5.67           | 43.6    | 151     | 53.8 | 272 | 41 | 12 |
| 245                       | M96-191              | Crkstn   | 6     | 32.7           | 79.5  | 38           | 76.8           | 2.8           | 1               | 11.9           | 5.48           | 48.2    | 154     | 65.5 | 231 | 35 | 25 |
| 246                       | M96-100              | Crkstn   | 6     | 34.0           | 85.3  | 42           | 76.5           | 2.6           | 1               | 12.6           | 5.44           | 44.4    | 141     | 60.9 | 314 | 32 | 31 |
| 247                       | M96-103              | Crkstn   | 6     | 33.9           | 82.3  | 41           | 76.9           | 2.5           | 1               | 11.9           | 5.49           | 47.3    | 133     | 70.3 | 189 | 32 | 31 |
| 248                       | M96-105              | Crkstn   | 6     | 33.9           | 79.5  | 38           | 77.4           | 2.8           | 1               | 11.8           | 5.97           | 54.1    | 141     | 68.2 | 208 | 35 | 25 |
| 249                       | M96-141              | Crkstn   | 6     | 33.1           | 81.1  | 43           | 78.0           | 2.6           | 1               | 11.7           | 5.62           | 48.8    | 137     | 72.5 | 251 | 32 | 31 |
| 250                       | M96-142              | Crkstn   | 6     | 32.4           | 74.7  | 39           | 76.4           | 2.7           | 1               | 12.9           | 5.95           | 47.9    | 128     | 86.7 | 219 | 21 | 43 |
| 251                       | FEG4-66              | Crkstn   | 6     | 32.0           | 78.3  | 45           | 76.2           | 2.5           | 1               | 15.4           | 6.79           | 45.6    | *191    | 85.3 | 179 | 20 | 45 |
| 222                       | MOREX MALT CHECK     |          | 6     | 30.6           | 68.3  | 71           | 78.8           | 1.8           | 1               | 12.2           | 6.32           | 54.9    | 133     | 73.6 | 64  | 27 |    |
| 242                       | MOREX MALT CHECK     |          | 6     | 30.6           | 68.7  | 72           | 79.5           | 2.0           | 1               | 12.2           | 6.30           | 53.6    | 150     | 76.1 | 64  | 33 |    |
| Minima                    |                      |          |       | 29.6           | 73.0  | 34           | 75.3           | 1.6           |                 | 10.7           | 5.03           | 43.1    | 115     | 45.5 | 68  | 12 |    |
| Maxima                    |                      |          |       | 36.6           | 85.3  | 67           | 80.7           | 3.3           |                 | 15.4           | 6.93           | 59.7    | 179     | 90.8 | 421 | 52 |    |
| Means                     |                      |          |       | 33.2           | 80.4  | 50           | 78.3           | 2.4           |                 | 12.3           | 5.92           | 50.3    | 139     | 63.3 | 197 | 35 |    |
| Standard Deviations       |                      |          |       | 1.2            | 2.8   | 11           | 1.5            | 0.4           |                 | 1.0            | 0.47           | 4.5     | 14      | 9.6  | 78  | 10 |    |
| Coefficients of Variation |                      |          |       | 3.7            | 3.5   | 22           | 1.9            | 18.5          |                 | 8.5            | 7.95           | 8.9     | 10      | 15.2 | 40  | 28 |    |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort colors were not determined (n.d.) on hazy samples

Samples Submitted by K. Smith, University of Minnesota - St. Paul

## 2000 ADVANCED LINES (GROUP 2) - ST. PAUL AND MORRIS, MN

Table 12

| Lab No. | Variety or Selection | Location | Rowed | Kernel         | on           | Barley            | Malt           | Barley        | Wort            | Alpha-         | Beta-          | Overall |     |      |     |    |    |
|---------|----------------------|----------|-------|----------------|--------------|-------------------|----------------|---------------|-----------------|----------------|----------------|---------|-----|------|-----|----|----|
|         |                      |          |       | Weight<br>(mg) | 6/64"<br>(%) | Color<br>(Agtron) | Extract<br>(%) | Wort<br>Color | Wort<br>Clarity | Protein<br>(%) | Protein<br>(%) |         |     |      |     |    |    |
| 252     | MOREX                | Morris   | 6     | 29.1           | 63.1         | 40                | 75.2           | 2.5           | 1               | 14.6           | 6.27           | 44.8    | 177 | 70.3 | 119 | 16 | 45 |
| 253     | ROBUST               | Morris   | 6     | 33.2           | 79.4         | 38                | 76.4           | 2.1           | 1               | 14.8           | 5.92           | 41.5    | 192 | 56.7 | 171 | 27 | 33 |
| 254     | STANDER              | Morris   | 6     | 33.3           | 82.2         | 39                | 77.8           | 3.1           | 1               | 13.2           | 6.93           | 54.3    | 170 | 86.6 | 100 | 28 | 28 |
| 255     | LACEY                | Morris   | 6     | 34.3           | 85.1         | 38                | 76.7           | 2.4           | 1               | 13.8           | 5.73           | 42.3    | 182 | 53.0 | 106 | 39 | 18 |
| 256     | M103                 | Morris   | 6     | 33.8           | 83.5         | 38                | 76.3           | 2.8           | 1               | 14.3           | 6.74           | 49.9    | 189 | 66.2 | 117 | 19 | 42 |
| 257     | M104                 | Morris   | 6     | 32.6           | 85.5         | 41                | 78.1           | 2.4           | 1               | 13.3           | 6.53           | 49.9    | 163 | 71.5 | 191 | 28 | 28 |
| 258     | M106                 | Morris   | 6     | 31.9           | 77.0         | 40                | 76.8           | 2.5           | 1               | 14.4           | 6.06           | 42.6    | 187 | 60.0 | 121 | 23 | 38 |
| 259     | M107                 | Morris   | 6     | 31.9           | 65.6         | 37                | 77.1           | 3.1           | 1               | 14.2           | 6.88           | 51.1    | 199 | 73.9 | 142 | 13 | 46 |
| 260     | M108                 | Morris   | 6     | 34.4           | 82.4         | 38                | 77.7           | 2.6           | 1               | 12.9           | 6.28           | 49.7    | 163 | 66.2 | 116 | 28 | 28 |
| 261     | M94-33               | Morris   | 6     | 33.4           | 75.2         | 44                | 76.9           | 2.9           | 1               | 13.8           | 6.62           | 48.9    | 190 | 66.3 | 160 | 18 | 43 |
| 263     | M95-52               | Morris   | 6     | 34.5           | 81.8         | 39                | 77.7           | 2.5           | 1               | 13.7           | 6.20           | 47.9    | 165 | 64.2 | 126 | 28 | 28 |
| 264     | M95-91               | Morris   | 6     | 35.9           | 83.3         | 42                | 77.3           | 2.5           | 1               | 13.4           | 6.02           | 46.3    | 187 | 57.3 | 158 | 24 | 35 |
| 265     | M95-106              | Morris   | 6     | 32.8           | 82.5         | 42                | 77.6           | 3.1           | 1               | 13.5           | 6.91           | 53.7    | 160 | 74.2 | 124 | 28 | 28 |
| 266     | M96-203              | Morris   | 6     | 32.0           | 80.7         | 37                | 77.7           | n.d.          | 3               | 12.9           | 5.86           | 47.5    | 188 | 57.0 | 222 | 25 | 34 |
| 267     | M96-77               | Morris   | 6     | 32.7           | 73.5         | 43                | 76.8           | 2.7           | 1               | 13.7           | 5.88           | 43.3    | 177 | 58.2 | 138 | 34 | 25 |
| 268     | M96-80               | Morris   | 6     | 32.0           | 76.5         | 39                | 77.1           | 2.5           | 1               | 13.5           | 6.06           | 45.3    | 184 | 60.6 | 173 | 23 | 38 |
| 269     | M96-177              | Morris   | 6     | 32.3           | 79.1         | 37                | 76.9           | 2.7           | 1               | 13.2           | 5.74           | 45.2    | 158 | 56.0 | 196 | 39 | 18 |
| 270     | M96-191              | Morris   | 6     | 33.5           | 81.3         | 37                | 76.7           | n.d.          | 3               | 13.2           | 5.75           | 45.9    | 173 | 55.9 | 191 | 30 | 27 |
| 271     | M96-100              | Morris   | 6     | 34.2           | 84.0         | 41                | 76.1           | 2.7           | 2               | 13.2           | 5.76           | 45.1    | 174 | 59.4 | 225 | 31 | 26 |
| 272     | M96-103              | Morris   | 6     | 32.5           | 74.9         | 43                | 76.9           | 2.9           | 2               | 12.9           | 6.25           | 49.2    | 146 | 62.6 | 181 | 24 | 35 |
| 273     | M96-105              | Morris   | 6     | 31.8           | 68.8         | 43                | 76.6           | 2.9           | 1               | 13.2           | 6.30           | 50.7    | 152 | 68.9 | 201 | 21 | 40 |
| 274     | M96-141              | Morris   | 6     | 31.2           | 69.2         | 41                | 77.0           | 3.1           | 1               | 13.2           | 6.32           | 48.5    | 153 | 64.6 | 201 | 21 | 40 |
| 275     | M96-142              | Morris   | 6     | 31.0           | 75.8         | 39                | 76.0           | 2.8           | 1               | 14.1           | 6.23           | 44.1    | 143 | 73.0 | 168 | 24 | 35 |
| 276     | FEGA-66              | Morris   | 6     | 30.4           | 78.8         | 49                | 75.7           | 2.6           | 1               | 16.0           | 7.32           | 47.7    | 221 | 61.5 | 137 | 18 | 43 |
| 277     | MOREX                | St. P.   | 6     | 31.1           | 71.4         | 64                | 78.0           | 1.7           | 1               | 12.3           | 5.59           | 48.3    | 142 | 59.7 | 114 | 40 | 16 |
| 278     | ROBUST               | St. P.   | 6     | 33.1           | 78.6         | 62                | 78.6           | 1.5           | 1               | 12.0           | 5.42           | 47.1    | 144 | 48.1 | 152 | 46 | 10 |
| 279     | STANDER              | St. P.   | 6     | 32.2           | 79.2         | 66                | 79.2           | 2.4           | 1               | 11.6           | 6.25           | 55.3    | 125 | 75.8 | 120 | 36 | 22 |
| 280     | LACEY                | St. P.   | 6     | 33.4           | 84.4         | 62                | 79.5           | 1.6           | 2               | 11.6           | 5.19           | 48.0    | 142 | 80.1 | 74  | 45 | 14 |
| 281     | M96-48               | St. P.   | 6     | 32.5           | 76.6         | 57                | 78.3           | 1.8           | 1               | 12.0           | 5.70           | 48.8    | 148 | 54.2 | 82  | 48 | 5  |
| 282     | M96-49               | St. P.   | 6     | 31.8           | 75.7         | 60                | 80.4           | 2.3           | 1               | 11.0           | 6.12           | 57.9    | 105 | 65.4 | 88  | 36 | 22 |

Table 12

| Lab No.                   | Variety or Selection | Location | Rowed | Kernel Weight (mg) | on 6/64" | Barley Color (Agtron) | Malt Extract (%) | Wort Color | Wort Clarity | Barley Protein (%) | Wort Protein (%) | S/T (%) | DP (°ASBC) | Alpha-amylase (20°DU) | Beta-glucan (ppm) | Quality Score | Overall Rank |
|---------------------------|----------------------|----------|-------|--------------------|----------|-----------------------|------------------|------------|--------------|--------------------|------------------|---------|------------|-----------------------|-------------------|---------------|--------------|
| 283                       | M96-56               | St. P.   | 6     | 32.9               | 73.9     | 63                    | 79.1             | 2.1        | 2            | 11.0               | 5.44             | 49.5    | 158        | 59.9                  | 95                | 47            | 7            |
| 284                       | M96-64               | St. P.   | 6     | 33.7               | 81.1     | 60                    | 79.2             | 2.1        | 2            | 11.5               | 5.43             | 49.4    | 139        | 56.5                  | 112               | 46            | 10           |
| 286                       | M96-67               | St. P.   | 6     | 33.4               | 80.3     | 58                    | 78.7             | 2.3        | 2            | 11.6               | 5.21             | 47.4    | 144        | 52.5                  | 73                | 49            | 2            |
| 287                       | M96-74               | St. P.   | 6     | 35.7               | 87.6     | 58                    | 79.4             | 2.3        | 2            | 11.0               | 5.42             | 49.4    | 134        | 52.3                  | 99                | 49            | 2            |
| 288                       | M96-99               | St. P.   | 6     | 35.3               | 83.4     | 62                    | 77.5             | n.d.       | 3            | 11.6               | 5.10             | 45.7    | 131        | 48.0                  | *289              | 46            | 10           |
| 289                       | M96-106              | St. P.   | 6     | 32.7               | 85.3     | 57                    | 77.6             | n.d.       | 3            | 12.2               | 5.09             | 43.6    | 144        | 48.0                  | *356              | 46            | 10           |
| 290                       | M96-108              | St. P.   | 6     | 31.6               | 73.8     | 57                    | 79.3             | 2.3        | 1            | 11.7               | 6.11             | 55.2    | 145        | 65.1                  | 163               | 36            | 22           |
| 291                       | M96-112              | St. P.   | 6     | 33.8               | 83.4     | 67                    | 78.0             | 1.8        | 2            | 11.7               | 5.00             | 43.9    | 166        | 46.2                  | 206               | 51            | 1            |
| 292                       | M96-140              | St. P.   | 6     | 33.8               | 82.7     | 70                    | 79.6             | 2.6        | 2            | 10.7               | 5.39             | 53.6    | 116        | 71.4                  | 149               | 38            | 21           |
| 293                       | M96-185              | St. P.   | 6     | 31.0               | 73.8     | 59                    | 79.0             | 2.3        | 2            | 11.0               | 5.21             | 47.1    | 159        | 54.2                  | 194               | 49            | 2            |
| 294                       | M96-186              | St. P.   | 6     | 32.4               | 79.1     | 61                    | 80.2             | n.d.       | 3            | 11.1               | 5.50             | 52.9    | 147        | 56.1                  | 184               | 47            | 7            |
| 295                       | M96-190              | St. P.   | 6     | 31.3               | 71.8     | 59                    | 80.0             | 2.3        | 1            | 11.4               | 5.83             | 52.9    | 153        | 57.9                  | 121               | 47            | 7            |
| 296                       | M96-192              | St. P.   | 6     | 32.4               | 74.7     | 59                    | 80.5             | 2.3        | 1            | 11.4               | 6.46             | 59.1    | 136        | 70.9                  | 105               | 41            | 15           |
| 297                       | M96-205              | St. P.   | 6     | 32.9               | 79.6     | 63                    | 79.1             | n.d.       | 3            | 11.9               | 5.60             | 50.2    | 146        | 55.3                  | 94                | 48            | 5            |
| 298                       | M96-213              | St. P.   | 6     | 34.6               | 81.4     | 57                    | 79.7             | 2.0        | 1            | 12.4               | 6.57             | 55.3    | 145        | 63.0                  | 155               | 39            | 18           |
| 299                       | FEG14-55             | St. P.   | 6     | 30.9               | 79.4     | 55                    | 77.8             | n.d.       | 3            | 12.2               | 5.98             | 51.9    | 155        | 55.0                  | 99                | 40            | 16           |
| 262                       | MOREX MALT CHECK     |          | 6     | 30.4               | 69.1     | 74                    | 79.4             | 1.9        | 1            | 12.5               | 6.23             | 51.4    | 137        | 74.1                  | 58                | 30            |              |
| 285                       | MOREX MALT CHECK     |          | 6     | 30.3               | 68.8     | 73                    | 79.5             | 1.9        | 1            | 11.8               | 6.34             | 52.7    | 140        | 70.7                  | 47                | 33            |              |
| Minima                    |                      |          |       | 29.1               | 63.1     | 37                    | 75.2             | 1.5        |              | 10.7               | 5.00             | 41.5    | 105        | 46.2                  | 73                | 13            |              |
| Maxima                    |                      |          |       | 35.9               | 87.6     | 70                    | 80.5             | 3.1        |              | 16.0               | 7.32             | 59.1    | 221        | 86.6                  | 225               | 51            |              |
| Means                     |                      |          |       | 32.8               | 78.4     | 50                    | 77.9             | 2.4        |              | 12.7               | 5.96             | 48.9    | 159        | 61.7                  | 142               | 34            |              |
| Standard Deviations       |                      |          |       | 1.4                | 5.4      | 11                    | 1.3              | 0.4        |              | 1.2                | 0.55             | 4.2     | 23         | 8.9                   | 42                | 11            |              |
| Coefficients of Variation |                      |          |       | 4.3                | 6.9      | 22                    | 1.7              | 17.0       |              | 9.8                | 9.26             | 8.5     | 15         | 14.4                  | 30                | 32            |              |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort colors were not determined (n.d.) on hazy samples

Samples Submitted by K. Smith, University of Minnesota - St. Paul

## 2000 ADVANCED LINES (GROUP 3) - CROOKSTON AND MORRIS, MN

Table 13

| Lab No. | Variety or Selection | Location | Rowed | Kernel | on      | Barley | Malt    | Barley | Wort    | Alpha-  | Beta-   | Quality | Overall |      |     |    |    |
|---------|----------------------|----------|-------|--------|---------|--------|---------|--------|---------|---------|---------|---------|---------|------|-----|----|----|
|         |                      |          |       | Weight | 6/64"   | Color  | Extract | Wort   | Wort    | Protein | Protein |         |         |      |     |    |    |
| (mg)    | (%)                  | (Agtron) | (%)   | Color  | Clarity | (%)    | (%)     | (%)    | (°ASBC) | (20°DU) | (ppm)   | Score   | Rank    |      |     |    |    |
| 300     | MOREX                | Crkstn   | 6     | 31.3   | 65.0    | 40     | 75.8    | 2.2    | 2       | 14.4    | 6.18    | 42.8    | 174     | 60.3 | 198 | 13 | 44 |
| 301     | ROBUST               | Crkstn   | 6     | 33.2   | 78.1    | 36     | 77.0    | 1.9    | 2       | 14.0    | 5.69    | 41.7    | 165     | 48.7 | 296 | 38 | 8  |
| 302     | STANDER              | Crkstn   | 6     | 33.7   | 79.4    | 36     | 78.6    | 2.6    | 1       | 13.0    | 6.58    | 51.3    | 143     | 73.2 | 252 | 31 | 23 |
| 303     | LACEY                | Crkstn   | 6     | 33.2   | 81.5    | 40     | 77.6    | 2.0    | 2       | 12.9    | 5.34    | 42.5    | 157     | 55.7 | 171 | 38 | 8  |
| 304     | M96-48               | Crkstn   | 6     | 33.2   | 80.0    | 39     | 77.4    | 2.1    | 1       | 13.2    | 5.73    | 45.1    | 153     | 57.7 | 162 | 39 | 5  |
| 305     | M96-49               | Crkstn   | 6     | 33.6   | 76.3    | 40     | 78.3    | 2.4    | 1       | 13.2    | 6.11    | 48.2    | 128     | 65.3 | 275 | 22 | 39 |
| 307     | M96-56               | Crkstn   | 6     | 33.3   | 72.1    | 38     | 77.4    | 2.3    | 2       | 12.6    | 5.70    | 46.7    | 159     | 57.5 | 194 | 31 | 23 |
| 308     | M96-64               | Crkstn   | 6     | 34.7   | 82.9    | 40     | 77.2    | 2.2    | 2       | 12.8    | 5.48    | 44.9    | 147     | 57.4 | 181 | 38 | 8  |
| 309     | M96-67               | Crkstn   | 6     | 33.1   | 79.0    | 38     | 77.6    | 2.2    | 2       | 13.1    | 5.54    | 43.4    | 157     | 54.8 | 146 | 45 | 2  |
| 310     | M96-74               | Crkstn   | 6     | 33.8   | 82.4    | 35     | 77.4    | 2.2    | 1       | 12.7    | 5.56    | 44.0    | 151     | 56.7 | 219 | 39 | 5  |
| 311     | M96-99               | Crkstn   | 6     | 34.8   | 81.5    | 38     | 76.4    | 2.1    | 1       | 11.5    | 4.73    | 41.5    | 119     | 49.5 | 432 | 41 | 3  |
| 312     | M96-106              | Crkstn   | 6     | 34.1   | 84.3    | 35     | 76.2    | 2.2    | 1       | 12.9    | 4.96    | 40.5    | 126     | 49.7 | 437 | 36 | 13 |
| 313     | M96-108              | Crkstn   | 6     | 33.8   | 77.1    | 40     | 78.0    | 2.6    | 1       | 12.0    | 6.00    | 50.3    | 141     | 64.2 | 236 | 35 | 16 |
| 314     | M96-112              | Crkstn   | 6     | 33.3   | 80.2    | 41     | 76.0    | 1.8    | 1       | 12.9    | 4.87    | 39.0    | 153     | 49.0 | 318 | 38 | 8  |
| 315     | M96-140              | Crkstn   | 6     | 34.4   | 82.0    | 38     | 77.4    | 2.3    | 1       | 12.5    | 5.22    | 44.5    | 121     | 67.2 | 251 | 37 | 12 |
| 316     | M96-185              | Crkstn   | 6     | 33.2   | 77.5    | 37     | 77.7    | 2.3    | 1       | 12.1    | 5.47    | 45.8    | 142     | 65.5 | 274 | 40 | 4  |
| 317     | M96-186              | Crkstn   | 6     | 32.7   | 73.9    | 34     | 77.8    | 2.5    | 1       | 12.5    | 5.61    | 46.5    | 139     | 59.1 | 248 | 29 | 30 |
| 318     | M96-190              | Crkstn   | 6     | 31.4   | 76.2    | 37     | 78.6    | 2.5    | 1       | 12.0    | 5.56    | 48.7    | 147     | 63.1 | 198 | 36 | 13 |
| 319     | M96-192              | Crkstn   | 6     | 32.8   | 79.2    | 37     | 79.0    | 3.0    | 1       | 13.0    | 6.61    | 53.7    | 138     | 72.4 | 216 | 31 | 23 |
| 320     | M96-205              | Crkstn   | 6     | 35.4   | 84.7    | 40     | 78.1    | 2.2    | 1       | 12.0    | 5.57    | 45.7    | 152     | 59.7 | 185 | 48 | 1  |
| 321     | M96-213              | Crkstn   | 6     | 34.4   | 83.1    | 42     | 77.8    | 2.7    | 1       | 11.9    | 6.01    | 50.7    | 141     | 65.6 | 237 | 32 | 20 |
| 322     | FEG14-55             | Crkstn   | 6     | *28.2  | 62.2    | 40     | 75.2    | 2.5    | 2       | 12.7    | 5.76    | 47.4    | 186     | 61.4 | 105 | 18 | 42 |
| 323     | MOREX                | Morris   | 6     | 32.8   | 79.4    | 42     | 76.0    | 2.2    | 1       | 14.8    | 6.11    | 42.4    | 198     | 63.4 | 123 | 24 | 35 |
| 324     | ROBUST               | Morris   | 6     | 34.9   | 85.2    | 38     | 76.6    | 1.9    | 1       | 15.3    | 5.95    | 40.1    | 209     | 48.8 | 228 | 30 | 28 |
| 325     | STANDER              | Morris   | 6     | 34.6   | 90.2    | 39     | 78.3    | 2.7    | 1       | 13.9    | 6.91    | 52.4    | 183     | 74.9 | 159 | 24 | 35 |
| 326     | LACEY                | Morris   | 6     | 34.1   | 86.7    | 41     | 77.2    | 2.0    | 1       | 13.5    | 5.90    | 43.7    | 186     | 58.6 | 170 | 32 | 20 |
| 327     | M96-48               | Morris   | 6     | 34.1   | 86.3    | 42     | 77.0    | 2.0    | 1       | 14.1    | 6.20    | 44.6    | 194     | 58.5 | 150 | 28 | 32 |
| 329     | M96-49               | Morris   | 6     | 36.1   | 87.4    | 38     | 78.0    | 2.4    | 1       | 13.5    | 6.40    | 48.2    | 157     | 65.7 | 175 | 31 | 23 |
| 330     | M96-56               | Morris   | 6     | 35.2   | 82.3    | 38     | 76.9    | 2.3    | 2       | 13.6    | 5.85    | 43.7    | 214     | 56.9 | 144 | 35 | 16 |
| 331     | M96-64               | Morris   | 6     | 36.0   | 89.5    | 42     | 77.1    | 2.0    | 1       | 13.7    | 5.68    | 41.9    | 195     | 56.2 | 150 | 32 | 20 |

Table 13

| Lab No.                   | Variety or Selection | Location | Rowed | Kernel Weight (mg) | on 6/64" | Barley Color (Agtron) | Malt Extract (%) | Wort Color | Wort Clarity | Barley Protein (%) | Wort Protein (%) | S/T (%) | DP (°ASBC) | Alpha-amylase (20°DU) | Beta-glucan (ppm) | Quality Score | Overall Rank |
|---------------------------|----------------------|----------|-------|--------------------|----------|-----------------------|------------------|------------|--------------|--------------------|------------------|---------|------------|-----------------------|-------------------|---------------|--------------|
| 332                       | M96-67               | Morris   | 6     | 35.0               | 85.3     | 40                    | 77.1             | 2.3        | 1            | 13.2               | 5.74             | 42.6    | 199        | 59.3                  | 114               | 36            | 13           |
| 333                       | M96-74               | Morris   | 6     | 37.0               | 90.2     | 42                    | 77.2             | 2.3        | 1            | 13.8               | 6.08             | 45.2    | 193        | 59.2                  | 176               | 29            | 30           |
| 334                       | M96-99               | Morris   | 6     | 35.5               | 84.6     | 42                    | 76.1             | 2.2        | 2            | 13.0               | 5.30             | 41.8    | 168        | 53.4                  | 400               | 39            | 5            |
| 335                       | M96-106              | Morris   | 6     | 35.7               | 89.2     | 39                    | 76.5             | n.d.       | 3            | 13.6               | 5.22             | 40.6    | 178        | 51.5                  | 361               | 34            | 18           |
| 336                       | M96-108              | Morris   | 6     | 33.7               | 85.0     | 46                    | 77.8             | 2.4        | 1            | 13.0               | 6.50             | 51.1    | 190        | 70.4                  | 181               | 20            | 40           |
| 337                       | M96-112              | Morris   | 6     | 34.9               | 88.2     | 47                    | 76.3             | 1.8        | 2            | 13.6               | 5.61             | 40.9    | 222        | 53.5                  | 275               | 34            | 18           |
| 338                       | M96-140              | Morris   | 6     | 35.7               | 86.8     | 43                    | 76.6             | 2.4        | 1            | 13.9               | 6.11             | 45.0    | 172        | 78.6                  | 213               | 25            | 34           |
| 339                       | M96-185              | Morris   | 6     | 33.3               | 87.0     | 39                    | 77.7             | 2.3        | 1            | 13.0               | 5.97             | 46.9    | 202        | 60.6                  | 215               | 23            | 38           |
| 340                       | M96-186              | Morris   | 6     | 35.0               | 97.6     | 39                    | 78.0             | 2.6        | 2            | 12.9               | 5.99             | 46.3    | 196        | 58.6                  | 276               | 30            | 28           |
| 341                       | M96-190              | Morris   | 6     | 33.5               | 82.7     | 41                    | 78.2             | 2.3        | 1            | 13.5               | 6.11             | 46.3    | 202        | 62.9                  | 189               | 24            | 35           |
| 342                       | M96-192              | Morris   | 6     | 34.0               | 82.7     | 40                    | 78.7             | 2.7        | 1            | 13.6               | 7.01             | 53.7    | 182        | 67.5                  | 139               | 28            | 32           |
| 343                       | M96-205              | Morris   | 6     | 35.0               | 83.8     | 39                    | 76.9             | 2.4        | 2            | 13.8               | 5.78             | 42.7    | 184        | 56.1                  | 152               | 31            | 23           |
| 344                       | M96-213              | Morris   | 6     | 34.5               | 83.7     | 43                    | 77.6             | 2.4        | 1            | 13.6               | 6.50             | 50.5    | 172        | 63.5                  | 197               | 20            | 40           |
| 345                       | FEG14-55             | Morris   | 6     | *29.5              | 68.8     | 41                    | 75.0             | 2.5        | 2            | 13.7               | 6.16             | 46.0    | 193        | 64.0                  | 95                | 15            | 43           |
| 306                       | MOREX MALT CHECK     |          | 6     | 30.5               | 67.4     | 73                    | 79.6             | 1.8        | 1            | 12.5               | 6.49             | 55.4    | 131        | 71.0                  | 74                | 25            |              |
| 328                       | MOREX MALT CHECK     |          | 6     | 30.9               | 68.2     | 73                    | 79.1             | 2.0        | 1            | 12.3               | 6.48             | 53.4    | 141        | 75.0                  | 76                | 33            |              |
| Minima                    |                      |          |       | 31.3               | 62.2     | 34                    | 75.0             | 1.8        |              | 11.5               | 4.73             | 39.0    | 119        | 48.7                  | 95                | 13            |              |
| Maxima                    |                      |          |       | 37.0               | 97.6     | 47                    | 79.0             | 3.0        |              | 15.3               | 7.01             | 53.7    | 222        | 78.6                  | 437               | 48            |              |
| Means                     |                      |          |       | 34.1               | 81.8     | 40                    | 77.3             | 2.3        |              | 13.2               | 5.85             | 45.5    | 169        | 60.4                  | 216               | 31            |              |
| Standard Deviations       |                      |          |       | 1.2                | 6.6      | 3                     | 0.9              | 0.3        |              | 0.8                | 0.50             | 3.8     | 27         | 7.1                   | 81                | 8             |              |
| Coefficients of Variation |                      |          |       | 3.5                | 8.1      | 7                     | 1.2              | 11.0       |              | 5.9                | 8.53             | 8.3     | 16         | 11.8                  | 37                | 25            |              |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort colors were not determined (n.d.) on hazy samples

Samples Submitted by K. Smith, University of Minnesota - St. Paul

## 2000 ADVANCED LINES (GROUP 4) - ST. PAUL AND CROOKSTON, MN

Table 14

| Lab No. | Variety or Selection | Location | Rowed | Kernel | on    | Barley | Malt    |      | Barley | Wort    |         | S/T  | DP      | Alpha-  | Beta-   | Quality | Overall |
|---------|----------------------|----------|-------|--------|-------|--------|---------|------|--------|---------|---------|------|---------|---------|---------|---------|---------|
|         |                      |          |       | Weight | 6/64" | Color  | Extract | Wort | Wort   | Protein | Protein | (%)  | (°ASBC) | (20°DU) | amylase | glucan  |         |
| 346     | MOREX                | St. P.   | 6     | 31.3   | 74.2  | 64     | 78.1    | 1.7  | 2      | 11.7    | 5.60    | 48.3 | 144     | 57.4    | 164     | 39      | 8       |
| 347     | ROBUST               | St. P.   | 6     | 33.2   | 78.0  | 65     | 77.9    | 1.6  | 2      | 11.8    | 5.29    | 44.8 | 141     | 47.3    | 234     | 50      | 2       |
| 348     | STANDER              | St. P.   | 6     | 32.9   | 81.7  | 60     | 79.2    | 2.2  | 2      | 11.1    | 6.09    | 57.3 | 115     | 68.5    | 160     | 31      | 27      |
| 349     | MNBRITE              | St. P.   | 6     | 31.7   | 73.1  | 69     | 78.4    | 1.9  | 1      | 11.6    | 6.24    | 53.5 | 156     | 65.3    | 147     | 37      | 15      |
| 351     | LACEY                | St. P.   | 6     | 34.2   | 84.1  | 65     | 79.1    | n.d. | 3      | 11.1    | 5.28    | 48.5 | 136     | 56.1    | 130     | 49      | 4       |
| 352     | FEG14-76-1           | St. P.   | 6     | 31.7   | 76.1  | 64     | 79.9    | n.d. | 3      | 11.5    | 5.46    | 50.1 | 133     | 57.2    | 195     | 38      | 11      |
| 353     | MAS2-54              | St. P.   | 6     | 36.0   | 86.0  | 68     | 76.6    | n.d. | 3      | 11.1    | 4.67    | 41.4 | 122     | 43.7    | 496     | 36      | 17      |
| 354     | FEG2-94              | St. P.   | 6     | 31.6   | 73.7  | 72     | 78.6    | n.d. | 3      | 11.9    | 5.85    | 51.1 | 163     | 49.4    | 204     | 38      | 11      |
| 355     | FEG3-09              | St. P.   | 6     | 34.9   | 86.1  | 68     | 79.8    | 2.1  | 2      | 10.4    | 6.07    | 61.5 | 110     | 63.8    | 124     | 30      | 29      |
| 356     | FEG4-67              | St. P.   | 6     | 34.9   | 88.2  | 58     | 80.0    | 2.2  | 2      | 11.3    | 5.83    | 53.7 | 117     | 57.9    | 167     | 38      | 11      |
| 357     | FEG6-28              | St. P.   | 6     | 31.0   | 67.2  | 65     | 76.8    | 1.8  | 2      | 11.8    | 5.57    | 49.3 | 103     | 53.9    | 324     | 25      | 31      |
| 358     | FEG10-09             | St. P.   | 6     | 34.7   | 80.7  | 67     | 79.9    | 2.1  | 2      | 10.6    | 5.73    | 57.8 | 110     | 61.6    | 173     | 34      | 22      |
| 359     | FEG11-89             | St. P.   | 6     | 30.6   | 65.2  | 72     | 78.6    | 1.9  | 2      | 11.2    | 5.95    | 54.1 | 152     | 62.7    | 77      | 32      | 23      |
| 360     | FEG12-115            | St. P.   | 6     | 33.6   | 77.8  | 66     | 77.7    | n.d. | 3      | 10.3    | 5.29    | 54.8 | 74      | 60.8    | 171     | 25      | 31      |
| 361     | FEG16-30             | St. P.   | 6     | 32.7   | 69.2  | 67     | 80.2    | 2.2  | 2      | 10.5    | 5.85    | 57.8 | 117     | 63.3    | 122     | 31      | 27      |
| 362     | FEG16-54             | St. P.   | 6     | 33.3   | 71.8  | 68     | 79.7    | 2.0  | 2      | 10.6    | 5.72    | 55.5 | 130     | 64.6    | 149     | 36      | 17      |
| 363     | MOREX                | Crkstn   | 6     | 31.5   | 73.6  | 42     | 77.0    | 2.1  | 2      | 11.3    | 5.15    | 46.7 | 143     | 58.8    | 120     | 43      | 6       |
| 364     | ROBUST               | Crkstn   | 6     | 34.4   | 81.2  | 43     | 77.2    | 1.7  | 2      | 12.4    | 5.03    | 43.1 | 157     | 47.2    | 262     | 50      | 2       |
| 365     | STANDER              | Crkstn   | 6     | 35.0   | 85.7  | 38     | 79.1    | 2.4  | 2      | 10.6    | 5.62    | 56.5 | 126     | 72.7    | 139     | 38      | 11      |
| 366     | MNBRITE              | Crkstn   | 6     | 34.0   | 84.1  | 50     | 78.1    | 2.1  | 2      | 11.9    | 5.80    | 50.6 | 166     | 66.3    | 94      | 39      | 8       |
| 367     | LACEY                | Crkstn   | 6     | 34.4   | 84.7  | 45     | 78.4    | 1.9  | 2      | 10.8    | 4.77    | 47.1 | 153     | 55.3    | 78      | 46      | 5       |
| 368     | FEG14-76-1           | Crkstn   | 6     | 33.8   | 76.0  | 47     | 79.2    | 2.0  | 2      | 11.5    | 4.64    | 41.7 | 159     | 52.2    | 193     | 55      | 1       |
| 369     | MAS2-54              | Crkstn   | 6     | 35.7   | 81.0  | 47     | 77.7    | 1.8  | 2      | 11.2    | 4.40    | 40.5 | 142     | 44.5    | *506    | 37      | 15      |
| 370     | FEG2-94              | Crkstn   | 6     | 31.9   | 56.3  | 54     | 76.8    | 1.8  | 2      | 12.5    | 5.19    | 40.7 | 184     | 46.9    | 228     | 32      | 23      |
| 372     | FEG3-09              | Crkstn   | 6     | 37.8   | 89.6  | 52     | 78.4    | 2.4  | 1      | 11.5    | 5.76    | 52.8 | 137     | 65.9    | 171     | 36      | 17      |
| 373     | FEG4-67              | Crkstn   | 6     | 35.0   | 88.4  | 42     | 78.9    | 1.9  | 1      | 11.3    | 5.36    | 50.5 | 127     | 62.3    | 150     | 39      | 8       |
| 374     | FEG6-28              | Crkstn   | 6     | 33.8   | 75.6  | 43     | 75.6    | 1.8  | 1      | 12.0    | 5.19    | 44.8 | 120     | 56.0    | 332     | 36      | 17      |
| 375     | FEG10-09             | Crkstn   | 6     | 37.1   | 85.0  | 42     | 78.8    | 2.4  | 1      | 10.6    | 5.47    | 55.7 | 124     | 64.8    | 68      | 32      | 23      |
| 376     | FEG11-89             | Crkstn   | 6     | 31.8   | 71.4  | 51     | 78.3    | 2.0  | 1      | 11.6    | 5.78    | 53.0 | 149     | 63.1    | 99      | 40      | 7       |
| 377     | FEG12-115            | Crkstn   | 6     | 35.0   | 79.0  | 45     | 76.7    | 2.2  | 1      | 11.0    | 5.11    | 49.7 | 86      | 64.5    | 224     | 32      | 23      |

Table 14

| Lab No.                   | Variety or Selection | Location | Rowed | Kernel         | on           | Barley            | Malt           | Barley        | Wort            | Alpha-         | Beta-          | Quality | Overall |      |     |    |    |
|---------------------------|----------------------|----------|-------|----------------|--------------|-------------------|----------------|---------------|-----------------|----------------|----------------|---------|---------|------|-----|----|----|
|                           |                      |          |       | Weight<br>(mg) | 6/64"<br>(%) | Color<br>(Agtron) | Extract<br>(%) | Wort<br>Color | Wort<br>Clarity | Protein<br>(%) | Protein<br>(%) |         |         |      |     |    |    |
| 378                       | FEG16-30             | Crkstn   | 6     | 32.3           | 67.5         | 48                | 79.3           | 2.2           | 1               | 10.1           | 5.24           | 55.4    | 123     | 63.0 | 200 | 29 | 30 |
| 379                       | FEG16-54             | Crkstn   | 6     | 34.4           | 71.1         | 49                | 78.8           | 2.3           | 2               | 10.8           | 5.49           | 53.6    | 143     | 65.0 | 235 | 36 | 17 |
| 350                       | MOREX MALT CHECK     |          | 6     | 30.5           | 68.9         | 69                | 79.7           | 2.2           | 1               | 12.7           | 6.59           | 51.9    | 135     | 73.5 | 80  | 25 |    |
| 371                       | MOREX MALT CHECK     |          | 6     | 30.8           | 68.8         | 70                | 79.4           | 1.8           | 1               | 12.4           | 6.42           | 54.1    | 147     | 70.9 | 51  | 33 |    |
| Minima                    |                      |          |       | 30.6           | 56.3         | 38                | 75.6           | 1.6           |                 | 10.1           | 4.40           | 40.5    | 74      | 43.7 | 68  | 25 |    |
| Maxima                    |                      |          |       | 37.8           | 89.6         | 72                | 80.2           | 2.4           |                 | 12.5           | 6.24           | 61.5    | 184     | 72.7 | 496 | 55 |    |
| Means                     |                      |          |       | 33.6           | 77.6         | 56                | 78.4           | 2.0           |                 | 11.2           | 5.45           | 50.7    | 133     | 58.8 | 182 | 37 |    |
| Standard Deviations       |                      |          |       | 1.8            | 7.8          | 11                | 1.2            | 0.2           |                 | 0.6            | 0.45           | 5.6     | 23      | 7.5  | 87  | 7  |    |
| Coefficients of Variation |                      |          |       | 5.3            | 10.1         | 19                | 1.5            | 11.2          |                 | 5.4            | 8.19           | 11.1    | 18      | 12.7 | 48  | 19 |    |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by K. Smith, University of Minnesota - St. Paul

## 2000 ADVANCED LINES (GROUP 5) - ST. PAUL AND CROOKSTON, MN

Table 15

| Lab No. | Variety or Selection | Location | Rowed | Kernel         | on           | Barley            | Malt           | Barley        | Wort            | Alpha-         | Beta-          | Quality | Overall |      |     |    |    |
|---------|----------------------|----------|-------|----------------|--------------|-------------------|----------------|---------------|-----------------|----------------|----------------|---------|---------|------|-----|----|----|
|         |                      |          |       | Weight<br>(mg) | 6/64"<br>(%) | Color<br>(Agtron) | Extract<br>(%) | Wort<br>Color | Wort<br>Clarity | Protein<br>(%) | Protein<br>(%) |         |         |      |     |    |    |
| 380     | ROBUST               | St. P.   | 6     | 32.6           | 78.3         | 67                | 78.8           | 1.4           | 1               | 11.2           | 5.09           | 47.7    | 148     | 48.8 | 149 | 54 | 1  |
| 381     | STANDER              | St. P.   | 6     | 33.0           | 80.4         | 67                | 79.6           | 1.9           | 1               | 10.4           | 5.63           | 56.2    | 126     | 74.2 | 121 | 34 | 16 |
| 382     | EXCEL                | St. P.   | 6     | 31.5           | 70.2         | 68                | 79.4           | 1.9           | 1               | 10.0           | 5.68           | 58.6    | 109     | 66.9 | 127 | 31 | 26 |
| 383     | LACEY                | St. P.   | 6     | 34.9           | 83.3         | 67                | 79.0           | 1.7           | 2               | 10.9           | 4.86           | 46.9    | 134     | 53.2 | 100 | 53 | 2  |
| 384     | M96-46               | St. P.   | 6     | 36.5           | 80.7         | 65                | 79.5           | 2.4           | 1               | 10.5           | 5.49           | 55.2    | 123     | 63.9 | 85  | 34 | 16 |
| 385     | M96-69               | St. P.   | 6     | 33.7           | 80.7         | 65                | 79.8           | 1.8           | 1               | 10.5           | 5.38           | 55.0    | 124     | 67.6 | 52  | 30 | 28 |
| 386     | M96-73               | St. P.   | 6     | 35.5           | 78.3         | 67                | 79.4           | 1.9           | 1               | 10.8           | 5.51           | 54.6    | 121     | 65.0 | 82  | 39 | 8  |
| 387     | M96-113              | St. P.   | 6     | 33.6           | 80.4         | 69                | 77.5           | 1.7           | 2               | 11.3           | 4.53           | 42.9    | 142     | 46.6 | 162 | 43 | 4  |
| 388     | M96-115              | St. P.   | 6     | 34.5           | 81.1         | 69                | 78.9           | 1.9           | 2               | 10.4           | 5.00           | 48.2    | 123     | 56.2 | 174 | 34 | 16 |
| 389     | M96-117              | St. P.   | 6     | 32.7           | 79.8         | 65                | 77.7           | 1.7           | 2               | 11.3           | 4.58           | 42.6    | 158     | 49.0 | 162 | 43 | 4  |
| 390     | M96-145              | St. P.   | 6     | 33.4           | 79.8         | 69                | 79.1           | 1.9           | 1               | 10.3           | 4.99           | 49.8    | 123     | 66.5 | 77  | 34 | 16 |
| 391     | M96-149              | St. P.   | 6     | 35.2           | 84.8         | 69                | 79.6           | 1.9           | 1               | 10.2           | 5.07           | 53.6    | 115     | 71.2 | 39  | 31 | 26 |
| 392     | M96-150              | St. P.   | 6     | 32.2           | 77.7         | 69                | 80.9           | 1.9           | 1               | 11.3           | 5.97           | 55.7    | 134     | 64.6 | 113 | 46 | 3  |
| 394     | M96-155              | St. P.   | 6     | 33.0           | 70.9         | 74                | 81.7           | 2.0           | 2               | 9.8            | 5.10           | 55.1    | 117     | 58.9 | 171 | 38 | 10 |
| 395     | M96-162              | St. P.   | 6     | 32.5           | 69.6         | 68                | 81.0           | 2.0           | 2               | 9.7            | 5.09           | 54.7    | 100     | 60.5 | 103 | 35 | 15 |
| 396     | M96-167              | St. P.   | 6     | 33.7           | 82.8         | 65                | 81.3           | 1.8           | 1               | 10.3           | 4.98           | 51.6    | 107     | 74.9 | 45  | 37 | 13 |
| 397     | M96-200              | St. P.   | 6     | 33.6           | 78.7         | 64                | 80.7           | 2.1           | 1               | 10.2           | 5.69           | 58.4    | 114     | 68.3 | 65  | 33 | 21 |
| 398     | M96-216              | St. P.   | 6     | *28.9          | 65.7         | 68                | 79.7           | 1.8           | 1               | 8.9            | 4.99           | 59.1    | 103     | 67.6 | 14  | 23 | 36 |
| 399     | M96-217              | St. P.   | 6     | 34.2           | 84.0         | 68                | 79.4           | 1.8           | 1               | 10.7           | 5.39           | 53.8    | 130     | 67.9 | 68  | 39 | 8  |
| 400     | ROBUST               | Crkstn   | 6     | 33.7           | 75.2         | 42                | 76.3           | 1.8           | 1               | 12.6           | 5.10           | 40.6    | 142     | 47.2 | 307 | 41 | 7  |
| 401     | STANDER              | Crkstn   | 6     | 33.8           | 81.8         | 40                | 78.5           | 2.5           | 1               | 12.3           | 5.99           | 51.4    | 123     | 68.7 | 287 | 32 | 23 |
| 402     | EXCEL                | Crkstn   | 6     | 33.4           | 71.0         | 44                | 77.8           | 2.4           | 1               | 11.8           | 6.10           | 51.5    | 106     | 61.8 | 300 | 23 | 36 |
| 403     | LACEY                | Crkstn   | 6     | 34.3           | 77.6         | 44                | 77.0           | 2.0           | 2               | 12.8           | 5.27           | 41.2    | 132     | 51.8 | 236 | 42 | 6  |
| 404     | M96-46               | Crkstn   | 6     | 35.9           | 74.5         | 45                | 78.5           | 2.6           | 1               | 12.5           | 5.89           | 48.7    | 126     | 64.8 | 195 | 25 | 35 |
| 405     | M96-69               | Crkstn   | 6     | 33.4           | 75.0         | 44                | 77.9           | 2.4           | 1               | 11.4           | 5.82           | 51.8    | 121     | 67.2 | 134 | 30 | 28 |
| 406     | M96-73               | Crkstn   | 6     | 33.8           | 71.8         | 48                | 78.5           | 2.5           | 1               | 12.2           | 5.91           | 49.9    | 122     | 64.8 | 199 | 30 | 28 |
| 407     | M96-113              | Crkstn   | 6     | 32.7           | 73.9         | 48                | 75.2           | 1.7           | 1               | 13.4           | 4.86           | 36.9    | 125     | 47.6 | 336 | 29 | 31 |
| 408     | M96-115              | Crkstn   | 6     | 34.6           | 78.0         | 48                | 77.2           | 2.0           | 1               | 11.6           | 5.21           | 45.4    | 111     | 56.4 | 303 | 38 | 10 |
| 409     | M96-117              | Crkstn   | 6     | 34.2           | 78.2         | 48                | 75.5           | 1.8           | 1               | 13.1           | 4.97           | 39.4    | 142     | 46.5 | 362 | 38 | 10 |
| 410     | M96-145              | Crkstn   | 6     | 32.6           | 78.8         | 51                | 77.5           | 2.1           | 1               | 11.0           | 5.06           | 48.1    | 112     | 72.8 | 189 | 32 | 23 |

Table 15

| Lab No.                   | Variety or Selection | Location | Rowed | Kernel Weight (mg) | on 6/64" | Barley Color (Agtron) | Malt Extract (%) | Wort Color | Wort Clarity | Barley Protein (%) | Wort Protein (%) | S/T (%) | DP (°ASBC) | Alpha-amylase (20°DU) | Beta-glucan (ppm) | Quality Score | Overall Rank |
|---------------------------|----------------------|----------|-------|--------------------|----------|-----------------------|------------------|------------|--------------|--------------------|------------------|---------|------------|-----------------------|-------------------|---------------|--------------|
| 411                       | M96-149              | Crkstn   | 6     | 33.9               | 78.8     | 44                    | 78.1             | 2.5        | 1            | 11.8               | 5.53             | 49.7    | 97         | 68.4                  | 236               | 32            | 23           |
| 412                       | M96-150              | Crkstn   | 6     | 32.0               | 70.1     | 51                    | 79.4             | 2.1        | 1            | 11.6               | 5.87             | 51.6    | 113        | 63.1                  | 213               | 33            | 21           |
| 413                       | M96-155              | Crkstn   | 6     | 32.9               | 63.5     | 47                    | 79.1             | 2.1        | 1            | 11.0               | 5.46             | 49.4    | 110        | 58.5                  | 256               | 34            | 16           |
| 414                       | M96-162              | Crkstn   | 6     | 32.0               | *55.3    | 42                    | 78.8             | 2.3        | 1            | 11.0               | 5.41             | 50.8    | 93         | 61.3                  | 221               | 26            | 33           |
| 415                       | M96-167              | Crkstn   | 6     | 32.9               | 73.3     | 43                    | 79.5             | 2.1        | 1            | 11.8               | 5.26             | 46.5    | 101        | 79.5                  | 160               | 37            | 13           |
| 416                       | M96-200              | Crkstn   | 6     | 35.7               | 78.4     | 44                    | 78.8             | 2.5        | 1            | 11.8               | 6.04             | 52.3    | 122        | 62.0                  | 218               | 29            | 31           |
| 417                       | M96-216              | Crkstn   | 6     | 30.5               | 64.3     | 41                    | 75.7             | 2.5        | 1            | 11.7               | 5.96             | 51.0    | 114        | 68.9                  | 100               | 26            | 33           |
| 418                       | M96-217              | Crkstn   | 6     | 33.1               | 73.7     | 42                    | 77.5             | 2.3        | 2            | 12.9               | 6.06             | 48.5    | 127        | 65.2                  | 278               | 17            | 38           |
| 393                       | MOREX MALT CHECK     |          | 6     | 30.9               | 69.5     | 70                    | 79.4             | 1.9        | 1            | 12.2               | 6.31             | 54.8    | 140        | 72.0                  | 80                | 30            |              |
| Minima                    |                      |          |       | 30.5               | 63.5     | 40                    | 75.2             | 1.4        |              | 8.9                | 4.53             | 36.9    | 93         | 46.5                  | 14                | 17            |              |
| Maxima                    |                      |          |       | 36.5               | 84.8     | 74                    | 81.7             | 2.6        |              | 13.4               | 6.10             | 59.1    | 158        | 79.5                  | 362               | 54            |              |
| Means                     |                      |          |       | 33.6               | 76.4     | 56                    | 78.7             | 2.0        |              | 11.2               | 5.39             | 50.1    | 121        | 62.3                  | 169               | 34            |              |
| Standard Deviations       |                      |          |       | 1.3                | 5.4      | 12                    | 1.5              | 0.3        |              | 1.0                | 0.44             | 5.4     | 14         | 8.6                   | 91                | 8             |              |
| Coefficients of Variation |                      |          |       | 3.7                | 7.1      | 21                    | 1.9              | 14.6       |              | 9.2                | 8.07             | 10.8    | 12         | 13.8                  | 54                | 22            |              |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by K. Smith, University of Minnesota - St. Paul

## 2000 ADVANCED LINES (GROUP 6) - ST. PAUL, MN

Table 16

| Lab No. | Variety or Selection | Rowed | Kernel | on    | Barley | Malt    | Barley | Wort    | Alpha- | Beta- | Overall |        |         |       |      |    |
|---------|----------------------|-------|--------|-------|--------|---------|--------|---------|--------|-------|---------|--------|---------|-------|------|----|
|         |                      |       | Weight | 6/64" | Color  | Extract | Wort   | Protein | S/T    | DP    | amylase | glucan | Quality | Score | Rank |    |
| 964     | ROBUST               | 6     | 33.6   | 78.8  | 59     | 78.4    | 1.7    | 1       | 12.2   | 5.62  | 48.6    | 146    | 45.9    | 305   | 43   | 5  |
| 965     | STANDER              | 6     | 31.6   | 79.0  | 51     | 79.3    | 2.3    | 1       | 12.1   | 6.46  | 55.8    | 138    | 71.9    | 201   | 35   | 20 |
| 966     | LACEY                | 6     | 35.8   | 86.6  | 58     | 79.5    | n.d.   | 3       | 11.6   | 5.35  | 46.7    | 154    | 54.5    | 115   | 51   | 1  |
| 967     | M97-07               | 6     | 36.3   | 84.3  | 52     | 78.7    | 3.1    | 2       | 12.9   | 6.79  | 53.1    | 144    | 61.4    | 177   | 30   | 33 |
| 968     | M97-09               | 6     | 35.8   | 76.6  | 50     | 77.3    | n.d.   | 3       | 12.9   | 5.80  | 47.9    | 147    | 50.3    | 333   | 30   | 33 |
| 969     | M97-10               | 6     | 35.5   | 77.9  | 59     | 80.4    | 2.3    | 2       | 12.0   | 6.61  | 55.1    | 135    | 65.8    | 162   | 38   | 12 |
| 970     | M97-21               | 6     | 32.6   | 76.3  | 50     | 77.9    | n.d.   | 3       | 12.8   | 5.61  | 46.7    | 141    | 49.5    | 294   | 33   | 24 |
| 972     | M97-22               | 6     | 34.2   | 82.4  | 55     | 78.1    | 2.2    | 2       | 12.4   | 5.78  | 48.3    | 150    | 54.3    | 219   | 45   | 4  |
| 973     | M97-59               | 6     | 31.6   | 72.6  | 52     | 80.0    | 2.2    | 1       | 11.9   | 6.11  | 53.6    | 127    | 63.9    | 328   | 29   | 35 |
| 974     | M97-60               | 6     | 34.8   | 84.1  | 47     | 79.5    | 2.6    | 2       | 12.3   | 6.06  | 50.7    | 127    | 57.8    | 273   | 35   | 20 |
| 975     | M97-61               | 6     | 32.1   | 77.9  | 54     | 80.5    | 2.2    | 1       | 11.2   | 5.85  | 54.6    | 122    | 60.3    | 292   | 38   | 12 |
| 976     | M97-77               | 6     | 33.8   | 83.3  | 56     | 78.9    | 2.2    | 1       | 12.0   | 5.82  | 50.4    | 129    | 58.3    | 227   | 36   | 16 |
| 977     | M97-78               | 6     | 32.9   | 80.3  | *65    | 78.8    | 2.2    | 1       | 12.2   | 6.34  | 54.9    | 133    | 62.1    | 178   | 33   | 24 |
| 978     | M97-91               | 6     | 32.7   | 81.2  | 54     | 79.6    | 2.2    | 1       | 11.6   | 6.35  | 56.3    | 132    | 63.7    | 245   | 36   | 16 |
| 979     | M97-93               | 6     | 34.6   | 76.9  | 52     | 78.8    | 2.2    | 1       | 12.5   | 6.35  | 53.0    | 125    | 61.7    | 248   | 22   | 42 |
| 980     | M97-94               | 6     | 34.7   | 85.5  | 56     | 80.0    | 2.2    | 1       | 11.8   | 6.00  | 52.4    | 125    | 62.4    | 285   | 38   | 12 |
| 981     | M97-02               | 6     | 33.9   | 81.1  | 50     | 79.0    | 2.1    | 1       | 12.5   | 6.16  | 51.1    | 136    | 56.6    | 239   | 40   | 7  |
| 982     | M97-11               | 6     | 34.3   | 79.7  | 57     | 77.3    | 2.0    | 1       | 13.7   | 6.15  | 46.6    | 163    | 54.8    | 352   | 28   | 36 |
| 983     | M97-12               | 6     | 35.3   | 77.6  | 53     | 78.5    | 2.6    | 2       | 12.1   | 5.84  | 50.7    | 132    | 52.6    | 289   | 42   | 6  |
| 984     | M97-27               | 6     | 32.5   | 71.9  | 57     | 78.5    | 1.9    | 1       | 12.6   | 5.89  | 47.0    | 147    | 55.4    | 273   | 36   | 16 |
| 985     | M97-28               | 6     | 33.1   | 77.2  | 54     | 78.2    | 1.9    | 1       | 12.4   | 5.85  | 47.1    | 151    | 54.2    | 225   | 46   | 2  |
| 986     | M97-79               | 6     | 33.7   | 78.6  | 58     | 77.9    | 2.0    | 1       | 13.1   | 5.88  | 44.9    | 160    | 57.7    | 217   | 39   | 8  |
| 987     | M97-81               | 6     | 36.1   | 82.7  | 54     | 78.0    | 1.9    | 1       | 13.8   | 5.76  | 43.6    | 156    | 54.1    | 299   | 46   | 2  |
| 988     | M97-82               | 6     | 34.0   | 80.9  | 59     | 78.0    | 2.0    | 1       | 11.8   | 5.61  | 46.4    | 153    | 56.5    | 245   | 39   | 8  |
| 989     | M97-95               | 6     | 36.2   | 85.5  | 57     | 79.6    | 2.2    | 1       | 12.6   | 6.20  | 52.1    | 121    | 64.2    | 230   | 27   | 37 |
| 990     | M97-96               | 6     | 35.3   | 81.1  | 52     | 79.2    | 2.2    | 1       | 12.9   | 6.49  | 51.7    | 135    | 63.4    | 292   | 31   | 29 |
| 991     | M97-97               | 6     | 33.2   | 73.7  | 52     | 78.5    | 2.2    | 1       | 12.7   | 6.46  | 51.9    | 132    | 68.2    | 350   | 23   | 41 |
| 992     | M97-98               | 6     | 33.0   | 77.8  | 55     | 79.4    | 2.2    | 1       | 12.6   | 6.52  | 54.5    | 145    | 68.9    | 295   | 34   | 23 |
| 993     | ROBUST               | 6     | 34.0   | 77.0  | 55     | 77.6    | 1.8    | 1       | 13.3   | 6.19  | 47.8    | 157    | 51.0    | 375   | 31   | 29 |
| 994     | STANDER              | 6     | 32.0   | 78.1  | 55     | 78.9    | 2.5    | 1       | 12.1   | 6.48  | 57.4    | 126    | 76.2    | 228   | 32   | 27 |

Table 16

| Lab No.                   | Variety or Selection | Rowed | Kernel | on    | Barley | Malt    | Barley | Wort | Alpha-  | Beta-   | Overall |         |        |         |       |      |
|---------------------------|----------------------|-------|--------|-------|--------|---------|--------|------|---------|---------|---------|---------|--------|---------|-------|------|
|                           |                      |       | Weight | 6/64" | Color  | Extract | Wort   | Wort | Protein | Protein |         | amylase | glucan | Quality | Score | Rank |
| 996                       | LACEY                | 6     | 35.8   | 85.9  | 59     | 79.1    | 2.0    | 1    | 12.6    | 5.87    | 49.4    | 149     | 61.8   | 203     | 37    | 15   |
| 997                       | M97-63               | 6     | 34.2   | 84.2  | 59     | 80.3    | 2.3    | 1    | 11.8    | 6.20    | 56.1    | 128     | 69.5   | 355     | 32    | 27   |
| 998                       | M97-64               | 6     | 34.2   | 83.3  | 57     | 80.1    | 2.4    | 1    | 11.7    | 6.22    | 57.2    | 128     | 68.2   | 239     | 35    | 20   |
| 999                       | M97-65               | 6     | 33.2   | 83.0  | 51     | 80.1    | 2.4    | 1    | 12.3    | 6.44    | 54.5    | 138     | 72.1   | 271     | 39    | 8    |
| 1000                      | M97-69               | 6     | 33.0   | 73.4  | 52     | 78.6    | 2.7    | 1    | 13.1    | 6.60    | 53.5    | 130     | 73.8   | 256     | 22    | 42   |
| 1001                      | M97-83               | 6     | 36.2   | 85.8  | 48     | 78.9    | 2.8    | 1    | 13.0    | 6.69    | 50.8    | 125     | 70.9   | 257     | 24    | 39   |
| 1002                      | M97-85               | 6     | 34.9   | 82.9  | 55     | 78.6    | 2.3    | 1    | 13.2    | 6.53    | 51.7    | 151     | 72.1   | 221     | 31    | 29   |
| 1003                      | M97-86               | 6     | 35.4   | 81.5  | 51     | 78.0    | 2.4    | 1    | 14.3    | 6.70    | 49.3    | 154     | 72.8   | 282     | 26    | 38   |
| 1004                      | M97-99               | 6     | 34.1   | 79.2  | 55     | 77.8    | 2.4    | 1    | 12.6    | 6.19    | 49.6    | 138     | 75.4   | 297     | 24    | 39   |
| 1005                      | M97-100              | 6     | 34.3   | 79.7  | 55     | 78.7    | 2.3    | 1    | 12.4    | 6.32    | 54.2    | 131     | 73.2   | 288     | 33    | 24   |
| 1006                      | M97-101              | 6     | 33.5   | 77.6  | 55     | 79.3    | 2.4    | 1    | 12.4    | 6.53    | 52.8    | 133     | 77.8   | 291     | 36    | 16   |
| 1007                      | M97-102              | 6     | 33.9   | 76.6  | 56     | 78.5    | 2.4    | 1    | 13.1    | 6.63    | 51.7    | 125     | 66.9   | 268     | 22    | 42   |
| 1008                      | M97-110              | 6     | 34.6   | 83.5  | 50     | 80.1    | 2.4    | 1    | 12.5    | 6.30    | 52.0    | 136     | 67.1   | 283     | 39    | 8    |
| 1009                      | M97-111              | 6     | 35.0   | 83.4  | 54     | 79.0    | 2.2    | 1    | 13.5    | 6.50    | 50.9    | 144     | 61.5   | 341     | 31    | 29   |
| 971                       | MOREX MALT CHECK     | 6     | 31.5   | 75.2  | 69     | 78.7    | 1.6    | 1    | 12.2    | 5.69    | 48.0    | 158     | 62.7   | 86      | 40    |      |
| 995                       | MOREX MALT CHECK     | 6     | 31.7   | 74.3  | 70     | 79.2    | 1.7    | 1    | 12.3    | 5.96    | 51.0    | 149     | 70.2   | 112     | 43    |      |
| Minima                    |                      |       | 31.6   | 71.9  | 47     | 77.3    | 1.7    |      | 11.2    | 5.35    | 43.6    | 121     | 45.9   | 115     | 22    |      |
| Maxima                    |                      |       | 36.3   | 86.6  | 59     | 80.5    | 3.1    |      | 14.3    | 6.79    | 57.4    | 163     | 77.8   | 375     | 51    |      |
| Means                     |                      |       | 34.1   | 80.2  | 54     | 78.9    | 2.2    |      | 12.5    | 6.18    | 51.2    | 139     | 62.7   | 265     | 34    |      |
| Standard Deviations       |                      |       | 1.3    | 3.8   | 3      | 0.8     | 0.3    |      | 0.6     | 0.35    | 3.4     | 11      | 8.1    | 55      | 7     |      |
| Coefficients of Variation |                      |       | 3.8    | 4.7   | 6      | 1.1     | 11.6   |      | 5.2     | 5.73    | 6.7     | 8       | 13.0   | 21      | 20    |      |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by K. Smith, University of Minnesota - St. Paul

## 2000 ADVANCED LINES (GROUP 7) - ST. PAUL, MN

Table 17

| Lab No. | Variety or Selection | Rowed | Kernel | on    | Barley | Malt    |            | Barley       | Wort        |             | S/T  | Alpha-     | Beta-           | Quality      | Overall |    |
|---------|----------------------|-------|--------|-------|--------|---------|------------|--------------|-------------|-------------|------|------------|-----------------|--------------|---------|----|
|         |                      |       | Weight | 6/64" | Color  | Extract | Wort Color | Wort Clarity | Protein (%) | Protein (%) | (%)  | DP (°ASBC) | amylase (20°DU) | glucan (ppm) |         |    |
| 1010    | ROBUST               | 6     | 33.1   | 76.8  | 65     | 78.8    | 1.6        | 1            | 11.3        | 5.23        | 49.5 | 119        | 44.8            | 305          | 35      | 29 |
| 1011    | STANDER              | 6     | 32.2   | 78.7  | 60     | 80.0    | 2.6        | 1            | 11.0        | 5.87        | 54.7 | 103        | 68.0            | 215          | 35      | 29 |
| 1012    | LACEY                | 6     | 34.5   | 78.4  | 66     | 79.2    | 2.3        | 2            | 11.1        | 5.07        | 48.8 | 125        | 53.0            | 201          | 45      | 7  |
| 1013    | M97-30               | 6     | 35.3   | 82.6  | 59     | 79.0    | 2.3        | 2            | 11.5        | 5.42        | 50.4 | 125        | 50.7            | 291          | 41      | 16 |
| 1014    | M97-31               | 6     | 36.5   | 85.8  | 62     | 78.4    | 2.3        | 2            | 11.9        | 5.57        | 49.1 | 112        | 48.5            | 255          | 38      | 20 |
| 1015    | M97-36               | 6     | 33.6   | 76.4  | 68     | 78.7    | 2.1        | 2            | 10.5        | 5.20        | 49.7 | 123        | 56.3            | 139          | 36      | 27 |
| 1016    | M97-44               | 6     | 34.9   | 82.2  | 62     | 79.5    | 2.0        | 2            | 10.8        | 4.99        | 50.0 | 126        | 56.6            | 172          | 42      | 12 |
| 1017    | M97-66               | 6     | 31.9   | 72.7  | 69     | 79.7    | 2.0        | 2            | 10.2        | 5.42        | 54.3 | 114        | 68.0            | 126          | 30      | 46 |
| 1018    | M97-67               | 6     | 34.5   | 79.9  | 60     | 80.4    | 2.1        | 2            | 10.5        | 5.38        | 55.3 | 113        | 65.6            | 178          | 32      | 43 |
| 1020    | M97-68               | 6     | 33.5   | 82.9  | 59     | 79.5    | 1.9        | 2            | 10.5        | 5.29        | 53.7 | 114        | 65.3            | 196          | 33      | 39 |
| 1021    | M97-73               | 6     | 33.4   | 71.8  | 62     | 79.5    | 2.4        | 2            | 10.9        | 5.76        | 54.5 | 92         | 61.8            | 197          | 32      | 43 |
| 1022    | M97-103              | 6     | 33.7   | 80.1  | 62     | 80.0    | 2.5        | 2            | 10.5        | 5.69        | 58.5 | 104        | 61.8            | 173          | 32      | 43 |
| 1023    | M97-104              | 6     | 33.4   | 78.7  | 70     | 80.6    | n.d.       | 3            | 9.7         | 5.44        | 57.7 | 106        | 65.8            | 136          | 35      | 29 |
| 1024    | M97-105              | 6     | 34.2   | 77.2  | 62     | 79.6    | n.d.       | 3            | 11.0        | 5.72        | 55.6 | 94         | 63.2            | 268          | 33      | 39 |
| 1025    | M97-106              | 6     | 34.4   | 80.7  | 62     | 79.9    | 2.2        | 1            | 10.2        | 5.76        | 58.0 | 100        | 69.1            | 189          | 30      | 46 |
| 1026    | M97-38               | 6     | 35.5   | 84.5  | 70     | 79.1    | n.d.       | 3            | 11.1        | 5.27        | 49.7 | 128        | 57.6            | 298          | 41      | 16 |
| 1027    | M97-40               | 6     | 34.4   | 80.4  | 65     | 79.6    | 2.0        | 2            | 11.1        | 5.47        | 52.1 | 134        | 61.8            | 155          | 38      | 20 |
| 1028    | M97-46               | 6     | 34.3   | 81.2  | 65     | 78.9    | 2.2        | 2            | 11.0        | 5.34        | 50.0 | 133        | 60.2            | 118          | 39      | 19 |
| 1029    | M97-47               | 6     | 33.9   | 78.5  | 66     | 78.8    | n.d.       | 3            | 11.0        | 5.15        | 48.4 | 133        | 62.5            | 123          | 42      | 12 |
| 1030    | M97-54               | 6     | 34.9   | 80.7  | 65     | 80.0    | 2.0        | 1            | 10.3        | 5.58        | 57.1 | 101        | 71.1            | 225          | 33      | 39 |
| 1031    | M97-55               | 6     | 34.3   | 80.5  | 68     | 79.8    | 2.2        | 1            | 10.1        | 5.70        | 60.5 | 102        | 74.0            | 110          | 34      | 37 |
| 1032    | M97-56               | 6     | 34.2   | 81.2  | 69     | 80.3    | 2.2        | 1            | 10.5        | 5.97        | 59.8 | 112        | 74.1            | 123          | 37      | 26 |
| 1033    | M97-57               | 6     | 36.0   | 86.3  | 61     | 80.1    | 2.1        | 1            | 10.4        | 5.71        | 59.0 | 91         | 65.9            | 235          | 33      | 39 |
| 1034    | M97-58               | 6     | 34.6   | 81.8  | 64     | 79.8    | 2.1        | 1            | 11.0        | 5.83        | 56.3 | 96         | 67.1            | 286          | 35      | 29 |
| 1035    | M97-107              | 6     | 33.9   | 80.6  | 64     | 80.1    | 2.0        | 1            | 10.7        | 5.76        | 57.7 | 105        | 67.7            | 225          | 38      | 20 |
| 1036    | M97-109              | 6     | 35.6   | 85.5  | 64     | 79.8    | 2.0        | 1            | 11.0        | 5.88        | 57.0 | 99         | 69.3            | 227          | 35      | 29 |
| 1037    | M97-114              | 6     | 34.0   | 80.5  | 62     | 80.0    | 2.0        | 1            | 10.8        | 5.92        | 59.0 | 106        | 70.3            | 170          | 35      | 29 |
| 1038    | M97-115              | 6     | 35.8   | 86.2  | 63     | 79.8    | 1.9        | 1            | 10.8        | 5.77        | 55.5 | 107        | 68.4            | 294          | 35      | 29 |
| 1039    | ROBUST               | 6     | 33.8   | 78.9  | 67     | 79.0    | 1.5        | 1            | 11.7        | 5.47        | 49.6 | 118        | 48.2            | 277          | 42      | 12 |
| 1040    | STANDER              | 6     | 33.2   | 84.3  | 66     | 80.0    | 2.1        | 1            | 10.8        | 5.78        | 56.1 | 93         | 74.5            | 169          | 35      | 29 |

Table 17

| Lab No.                   | Variety or Selection | Rowed | Kernel         | on           | Barley            | Malt           | Barley        | Wort            | Alpha-         | Beta-          | Quality | Overall |      |     |    |    |
|---------------------------|----------------------|-------|----------------|--------------|-------------------|----------------|---------------|-----------------|----------------|----------------|---------|---------|------|-----|----|----|
|                           |                      |       | Weight<br>(mg) | 6/64"<br>(%) | Color<br>(Agtron) | Extract<br>(%) | Wort<br>Color | Wort<br>Clarity | Protein<br>(%) | Protein<br>(%) |         |         |      |     |    |    |
| 1041                      | LACEY                | 6     | 34.4           | 85.6         | 66                | 79.5           | 1.7           | 1               | 11.2           | 5.17           | 48.8    | 123     | 55.9 | 151 | 43 | 9  |
| 1042                      | M97-16               | 6     | 33.9           | 81.5         | 64                | 78.9           | 1.6           | 1               | 11.9           | 5.52           | 49.0    | 168     | 53.1 | 137 | 50 | 5  |
| 1044                      | M97-17               | 6     | 32.5           | 75.0         | 65                | 78.2           | 1.7           | 1               | 11.0           | 5.18           | 48.7    | 126     | 56.0 | 166 | 38 | 20 |
| 1045                      | M97-18               | 6     | 34.7           | 80.8         | 63                | 78.6           | 1.7           | 2               | 11.9           | 5.09           | 44.2    | 156     | 55.3 | 156 | 51 | 3  |
| 1046                      | M97-19               | 6     | 35.0           | 83.1         | 64                | 79.5           | 1.7           | 1               | 11.1           | 5.08           | 48.7    | 133     | 54.3 | 159 | 50 | 5  |
| 1047                      | M97-20               | 6     | 31.6           | 75.1         | 67                | 78.5           | 1.6           | 1               | 12.2           | 5.25           | 45.6    | 164     | 54.4 | 137 | 53 | 2  |
| 1048                      | M97-32               | 6     | 36.1           | 85.2         | 66                | 80.3           | 1.9           | 1               | 10.6           | 5.72           | 56.0    | 118     | 71.6 | 77  | 38 | 20 |
| 1049                      | M97-34               | 6     | 34.2           | 84.5         | 67                | 80.2           | 2.0           | 1               | 10.7           | 5.70           | 56.1    | 118     | 70.9 | 76  | 38 | 20 |
| 1050                      | M97-50               | 6     | 33.8           | 79.7         | 70                | 79.5           | 2.0           | 1               | 10.5           | 5.76           | 58.6    | 100     | 73.4 | 85  | 34 | 37 |
| 1051                      | M97-51               | 6     | 34.5           | 84.3         | 66                | 78.9           | 1.9           | 2               | 11.1           | 4.84           | 46.4    | 129     | 56.7 | 96  | 43 | 9  |
| 1052                      | M97-53               | 6     | 34.0           | 81.5         | 68                | 78.8           | 1.7           | 1               | 10.5           | 5.27           | 51.0    | 131     | 58.6 | 101 | 43 | 9  |
| 1053                      | M97-87               | 6     | 35.9           | 87.7         | 67                | 78.2           | 1.8           | 2               | 11.2           | 4.80           | 45.8    | 125     | 50.7 | 130 | 51 | 3  |
| 1054                      | M97-88               | 6     | 35.4           | 85.2         | 64                | 78.8           | 1.9           | 1               | 11.4           | 5.80           | 53.5    | 114     | 69.1 | 114 | 36 | 27 |
| 1055                      | M97-90               | 6     | 35.0           | 80.8         | 64                | 78.8           | 1.8           | 1               | 11.0           | 5.16           | 50.1    | 122     | 58.5 | 98  | 44 | 8  |
| 1056                      | M97-117              | 6     | *30.4          | 73.3         | 69                | 78.9           | n.d.          | 3               | 10.2           | 4.63           | 47.5    | 125     | 51.7 | 130 | 40 | 18 |
| 1057                      | M97-118              | 6     | 33.0           | 79.4         | 64                | 78.6           | n.d.          | 3               | 10.2           | 4.50           | 47.3    | 120     | 50.4 | 151 | 29 | 48 |
| 1058                      | M97-119              | 6     | 33.5           | 83.8         | 67                | 79.4           | 1.8           | 1               | 10.0           | 5.12           | 52.9    | 102     | 59.1 | 144 | 42 | 12 |
| 1059                      | M97-120              | 6     | 32.8           | 77.9         | 68                | 79.1           | 1.8           | 1               | 11.0           | 4.69           | 45.3    | 129     | 53.0 | 115 | 55 | 1  |
| 1019                      | MOREX MALT CHECK     | 6     | 31.5           | 73.5         | 69                | 79.6           | 1.7           | 2               | 12.1           | 5.83           | 49.0    | 156     | 71.6 | 108 | 42 |    |
| 1043                      | MOREX MALT CHECK     | 6     | 31.8           | 73.8         | 67                | 79.3           | 1.6           | 1               | 12.4           | 5.89           | 50.1    | 143     | 64.9 | 134 | 43 |    |
| Minima                    |                      |       | 31.6           | 71.8         | 59                | 78.2           | 1.5           |                 | 9.7            | 4.50           | 44.2    | 91      | 44.8 | 76  | 29 |    |
| Maxima                    |                      |       | 36.5           | 87.7         | 70                | 80.6           | 2.6           |                 | 12.2           | 5.97           | 60.5    | 168     | 74.5 | 305 | 55 |    |
| Means                     |                      |       | 34.2           | 80.8         | 65                | 79.4           | 2.0           |                 | 10.9           | 5.41           | 52.6    | 117     | 61.3 | 173 | 39 |    |
| Standard Deviations       |                      |       | 1.1            | 3.7          | 3                 | 0.6            | 0.3           |                 | 0.5            | 0.37           | 4.5     | 17      | 8.0  | 64  | 6  |    |
| Coefficients of Variation |                      |       | 3.2            | 4.6          | 5                 | 0.8            | 12.6          |                 | 4.9            | 6.79           | 8.6     | 15      | 13.1 | 37  | 16 |    |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by K. Smith, University of Minnesota - St. Paul

## 2000 ADVANCED LINES (GROUP 8) - CROOKSTON, MN

Table 18

| Lab No. | Variety or Selection | Rowed | Kernel | on    | Barley | Malt    |      | Barley | Wort    |         | Alpha- | Beta- | Overall |        |         |       |
|---------|----------------------|-------|--------|-------|--------|---------|------|--------|---------|---------|--------|-------|---------|--------|---------|-------|
|         |                      |       | Weight | 6/64" | Color  | Extract | Wort | Wort   | Protein | Protein | S/T    | DP    | amylase | glucan | Quality | Score |
| 1060    | ROBUST               | 6     | 33.9   | 76.0  | 45     | 77.3    | 1.9  | 1      | 13.2    | 5.27    | 41.7   | 147   | 49.2    | 328    | 41      | 11    |
| 1061    | STANDER              | 6     | 34.9   | 85.9  | 44     | 78.6    | 2.7  | 1      | 12.4    | 6.03    | 49.0   | 124   | 76.4    | 319    | 26      | 34    |
| 1062    | LACEY                | 6     | 33.1   | 78.6  | 45     | 77.6    | 1.9  | 1      | 12.2    | 5.23    | 43.3   | 138   | 56.7    | 205    | 45      | 7     |
| 1063    | M97-07               | 6     | 37.7   | 87.2  | 42     | 77.9    | 2.7  | 1      | 13.4    | 6.49    | 51.0   | 129   | 68.8    | 196    | 20      | 41    |
| 1064    | M97-09               | 6     | 36.4   | 81.3  | 44     | 77.0    | 2.5  | 2      | 12.7    | 5.21    | 41.5   | 126   | 53.1    | 370    | 35      | 15    |
| 1065    | M97-10               | 6     | 36.7   | 78.3  | 47     | 78.5    | 2.5  | 1      | 12.6    | 6.17    | 51.0   | 104   | 66.4    | 310    | 21      | 40    |
| 1066    | M97-21               | 6     | 34.2   | 78.2  | 50     | 77.9    | 1.9  | 1      | 11.8    | 5.05    | 43.8   | 132   | 56.8    | 261    | 45      | 7     |
| 1068    | M97-22               | 6     | 34.4   | 78.3  | 45     | 76.9    | 2.0  | 1      | 12.5    | 5.30    | 42.5   | 134   | 54.8    | 354    | 45      | 7     |
| 1069    | M97-59               | 6     | 33.8   | 70.3  | 45     | 78.7    | 2.1  | 1      | 11.7    | 5.42    | 46.9   | 132   | 70.1    | 371    | 31      | 22    |
| 1070    | M97-60               | 6     | 35.8   | 83.8  | 46     | 78.9    | 2.2  | 1      | 11.8    | 5.70    | 48.9   | 131   | 69.6    | 297    | 39      | 12    |
| 1071    | M97-61               | 6     | 32.3   | 71.2  | 47     | 78.8    | 2.1  | 1      | 11.5    | 5.40    | 49.0   | 133   | 71.6    | 326    | 31      | 22    |
| 1072    | M97-77               | 6     | 34.2   | 80.9  | 48     | 77.0    | 2.3  | 1      | 12.7    | 5.88    | 48.1   | 116   | 69.5    | 334    | 20      | 41    |
| 1073    | M97-78               | 6     | 33.5   | 78.2  | 51     | 77.5    | 2.4  | 1      | 13.3    | 5.98    | 47.2   | 108   | 66.8    | 358    | 20      | 41    |
| 1074    | M97-91               | 6     | 34.2   | 73.7  | 42     | 78.0    | 2.3  | 1      | 12.4    | 5.65    | 46.9   | 110   | 65.3    | 334    | 23      | 38    |
| 1075    | M97-93               | 6     | 35.1   | 80.9  | 48     | 78.6    | 2.3  | 1      | 11.5    | 5.80    | 51.3   | 114   | 72.4    | 318    | 29      | 26    |
| 1076    | M97-94               | 6     | 33.8   | 80.1  | 47     | 78.3    | 2.2  | 1      | 12.7    | 5.94    | 48.2   | 114   | 66.6    | 431    | 24      | 35    |
| 1077    | M97-02               | 6     | 34.9   | 84.1  | 43     | 77.6    | 2.1  | 1      | 11.5    | 5.20    | 47.1   | 130   | 62.6    | 238    | 36      | 14    |
| 1078    | M97-11               | 6     | 36.6   | 85.5  | 45     | 76.8    | 2.2  | 2      | 12.2    | 5.11    | 41.9   | 145   | 51.6    | 312    | 47      | 5     |
| 1079    | M97-12               | 6     | 38.4   | 84.3  | 44     | 77.0    | n.d. | 3      | 12.2    | 4.97    | 41.2   | 114   | 49.8    | 413    | 39      | 12    |
| 1080    | M97-27               | 6     | 35.1   | 78.4  | 45     | 77.9    | 1.9  | 1      | 12.2    | 4.96    | 41.1   | 134   | 53.6    | 279    | 48      | 2     |
| 1081    | M97-28               | 6     | 34.4   | 80.4  | 45     | 77.0    | 2.1  | 1      | 12.2    | 4.89    | 42.4   | 132   | 52.1    | 273    | 48      | 2     |
| 1082    | M97-79               | 6     | 35.0   | 79.5  | 47     | 77.4    | 2.0  | 1      | 12.7    | 4.95    | 39.7   | 136   | 55.6    | 310    | 32      | 17    |
| 1083    | M97-81               | 6     | 34.8   | 83.1  | 48     | 76.8    | 1.9  | 1      | 12.2    | 4.79    | 40.5   | 138   | 53.8    | 260    | 48      | 2     |
| 1084    | M97-82               | 6     | 34.6   | 83.1  | 45     | 77.1    | 2.1  | 2      | 11.3    | 4.71    | 42.2   | 136   | 52.9    | 202    | 47      | 5     |
| 1085    | M97-95               | 6     | 35.0   | 81.5  | 44     | 78.4    | 2.2  | 1      | 11.6    | 5.56    | 50.9   | 111   | 65.3    | 220    | 32      | 17    |
| 1086    | M97-96               | 6     | 34.0   | 77.4  | 42     | 77.3    | 2.2  | 1      | 12.4    | 5.50    | 46.3   | 117   | 67.8    | 287    | 28      | 29    |
| 1087    | M97-97               | 6     | 33.5   | 71.8  | 49     | 77.5    | 2.2  | 1      | 11.7    | 5.60    | 49.2   | 120   | 68.6    | 315    | 23      | 38    |
| 1088    | M97-98               | 6     | 33.1   | 74.0  | 48     | 78.2    | 2.2  | 1      | 11.6    | 5.51    | 50.6   | 131   | 72.6    | 276    | 34      | 16    |
| 1089    | ROBUST               | 6     | 33.7   | 74.7  | 41     | 77.8    | 1.7  | 1      | 12.1    | 5.23    | 45.0   | 141   | 47.2    | 226    | 49      | 1     |
| 1090    | STANDER              | 6     | 35.9   | 84.6  | 44     | 78.8    | 2.4  | 1      | 11.4    | 5.68    | 53.4   | 114   | 82.6    | 179    | 32      | 17    |

Table 18

| Lab No.                   | Variety or Selection | Rowed | Kernel          | on   | Barley            | Malt           | Barley        | Wort            | Alpha-         | Beta-          | Overall |               |                  |        |               |      |
|---------------------------|----------------------|-------|-----------------|------|-------------------|----------------|---------------|-----------------|----------------|----------------|---------|---------------|------------------|--------|---------------|------|
|                           |                      |       | Weight<br>6/64" | (mg) | Color<br>(Agtron) | Extract<br>(%) | Wort<br>Color | Wort<br>Clarity | Protein<br>(%) | Protein<br>(%) |         | DP<br>(20°DU) | amylase<br>(ppm) | glucan | Quality Score | Rank |
| 1092                      | LACEY                | 6     | 34.4            | 78.1 | 44                | 77.4           | 2.0           | 1               | 12.6           | 5.18           | 40.5    | 135           | 54.5             | 211    | 43            | 10   |
| 1093                      | M97-63               | 6     | 34.6            | 77.8 | 40                | 78.8           | 2.2           | 1               | 11.8           | 5.70           | 51.1    | 106           | 66.4             | 450    | 29            | 26   |
| 1094                      | M97-64               | 6     | 35.1            | 81.6 | 43                | 78.4           | 2.3           | 1               | 12.5           | 5.96           | 48.4    | 112           | 65.1             | 455    | 24            | 35   |
| 1095                      | M97-65               | 6     | 32.4            | 70.4 | 39                | 79.5           | 2.3           | 1               | 11.9           | 6.00           | 53.7    | 119           | 67.5             | 360    | 30            | 24   |
| 1096                      | M97-69               | 6     | 34.0            | 75.3 | 49                | 79.4           | 2.3           | 1               | 11.4           | 5.68           | 51.9    | 90            | 66.6             | 381    | 30            | 24   |
| 1097                      | M97-83               | 6     | 34.6            | 80.6 | 39                | 78.1           | 2.9           | 1               | 12.7           | 6.81           | 54.4    | 94            | 70.6             | 270    | 24            | 35   |
| 1098                      | M97-85               | 6     | 34.6            | 81.1 | 42                | 78.4           | 2.3           | 1               | 11.6           | 5.90           | 51.5    | 121           | 70.0             | 172    | 32            | 17   |
| 1099                      | M97-86               | 6     | 37.3            | 84.5 | 47                | 78.2           | 2.3           | 1               | 11.8           | 5.79           | 48.8    | 115           | 69.4             | 279    | 32            | 17   |
| 1100                      | M97-99               | 6     | 34.6            | 71.3 | 42                | 78.4           | 2.2           | 1               | 11.3           | 5.44           | 51.6    | 110           | 68.4             | 342    | 27            | 30   |
| 1101                      | M97-100              | 6     | 34.5            | 74.8 | 45                | 78.2           | 2.2           | 1               | 11.6           | 5.75           | 52.4    | 106           | 65.7             | 324    | 27            | 30   |
| 1102                      | M97-101              | 6     | 33.8            | 72.1 | 46                | 78.8           | 2.2           | 1               | 11.1           | 5.72           | 55.0    | 106           | 70.4             | 317    | 27            | 30   |
| 1103                      | M97-102              | 6     | 34.2            | 73.6 | 45                | 77.9           | 2.5           | 1               | 12.6           | 6.54           | 55.2    | 112           | 70.6             | 194    | 18            | 44   |
| 1104                      | M97-110              | 6     | 34.0            | 77.5 | 45                | 78.9           | 2.1           | 1               | 11.6           | 5.56           | 50.6    | 105           | 63.7             | 373    | 29            | 26   |
| 1105                      | M97-111              | 6     | 33.6            | 75.8 | 42                | 78.5           | 2.2           | 1               | 12.2           | 5.88           | 48.9    | 119           | 68.7             | 343    | 27            | 30   |
| 1067                      | MOREX MALT CHECK     | 6     | 31.5            | 74.9 | 71                | 78.9           | 1.7           | 1               | 12.4           | 5.54           | 47.1    | 140           | 66.7             | 96     | 37            |      |
| 1091                      | MOREX MALT CHECK     | 6     | 31.5            | 73.3 | 71                | 78.9           | 1.6           | 1               | 12.6           | 5.59           | 46.8    | 141           | 66.7             | 92     | 35            |      |
| Minima                    |                      |       | 32.3            | 70.3 | 39                | 76.8           | 1.7           |                 | 11.1           | 4.71           | 39.7    | 90            | 47.2             | 172    | 18            |      |
| Maxima                    |                      |       | 38.4            | 87.2 | 51                | 79.5           | 2.9           |                 | 13.4           | 6.81           | 55.2    | 147           | 82.6             | 455    | 49            |      |
| Means                     |                      |       | 34.6            | 78.6 | 45                | 78.0           | 2.2           |                 | 12.1           | 5.57           | 47.6    | 121           | 63.8             | 304    | 33            |      |
| Standard Deviations       |                      |       | 1.3             | 4.5  | 3                 | 0.7            | 0.2           |                 | 0.6            | 0.47           | 4.5     | 14            | 8.3              | 71     | 9             |      |
| Coefficients of Variation |                      |       | 3.7             | 5.8  | 6                 | 0.9            | 10.6          |                 | 4.7            | 8.38           | 9.4     | 11            | 13.0             | 23     | 28            |      |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by K. Smith, University of Minnesota - St. Paul

## 2000 ADVANCED LINES (GROUP 9) - CROOKSTON, MN

Table 19

| Lab No. | Variety or Selection | Rowed | Kernel Weight (mg) | on 6/64" | Barley Color (Agtron) | Malt Extract (%) | Wort Color | Wort Clarity | Barley Protein (%) | Wort Protein (%) | S/T (%) | DP (°ASBC) | Alpha-amylase (20°DU) | Beta-glucan (ppm) | Quality Score | Overall Rank |
|---------|----------------------|-------|--------------------|----------|-----------------------|------------------|------------|--------------|--------------------|------------------|---------|------------|-----------------------|-------------------|---------------|--------------|
| 1106    | ROBUST               | 6     | 34.5               | 79.4     | 40                    | 76.9             | 1.9        | 1            | *13.2              | 5.44             | 43.5    | 137        | 46.3                  | 438               | 36            | 23           |
| 1107    | STANDER              | 6     | 35.8               | 86.2     | 39                    | 79.1             | 2.4        | 1            | 11.6               | 6.03             | 53.4    | 103        | 67.0                  | 394               | 29            | 38           |
| 1108    | LACEY                | 6     | 34.1               | 82.5     | 44                    | 78.8             | 2.0        | 1            | 11.2               | 5.36             | 49.3    | 113        | 59.3                  | 207               | 36            | 23           |
| 1109    | M97-30               | 6     | 35.5               | 82.0     | 42                    | 77.5             | 2.0        | 1            | 12.3               | 5.26             | 44.0    | 120        | 52.6                  | 398               | 41            | 13           |
| 1110    | M97-31               | 6     | 35.8               | 84.2     | 43                    | 77.5             | 2.1        | 1            | 12.1               | 5.62             | 49.3    | 134        | 60.0                  | 199               | 32            | 32           |
| 1111    | M97-36               | 6     | 36.1               | 80.5     | 43                    | 77.9             | 2.1        | 1            | 12.4               | 5.28             | 44.5    | 123        | 55.3                  | 276               | 41            | 13           |
| 1113    | M97-44               | 6     | 34.5               | 80.6     | 45                    | 78.1             | 1.9        | 1            | 12.1               | 5.28             | 46.1    | 126        | 54.3                  | 261               | 43            | 10           |
| 1114    | M97-66               | 6     | 33.7               | 74.4     | 45                    | 79.3             | 2.2        | 1            | 11.4               | 5.64             | 52.5    | 107        | 72.6                  | 314               | 30            | 36           |
| 1115    | M97-67               | 6     | 36.3               | 81.7     | 42                    | 79.1             | 2.1        | 1            | 11.4               | 5.47             | 50.9    | 104        | 63.2                  | 278               | 35            | 28           |
| 1116    | M97-68               | 6     | 33.8               | 74.2     | 42                    | 79.1             | 2.2        | 1            | 11.3               | 5.50             | 51.3    | 99         | 65.0                  | 326               | 30            | 36           |
| 1117    | M97-73               | 6     | 33.9               | 77.6     | 42                    | 78.1             | 2.3        | 1            | 11.9               | 5.60             | 48.2    | 89         | 61.1                  | 431               | 29            | 38           |
| 1118    | M97-103              | 6     | 33.6               | 73.7     | 41                    | 78.4             | 2.2        | 1            | 11.4               | 5.60             | 52.3    | 97         | 65.4                  | 320               | 27            | 44           |
| 1119    | M97-104              | 6     | 32.5               | *65.8    | 43                    | 78.5             | 2.2        | 1            | 11.7               | 5.76             | 51.3    | 107        | 59.9                  | 322               | 28            | 43           |
| 1120    | M97-105              | 6     | 32.7               | *64.1    | 42                    | 77.8             | 2.3        | 1            | 11.3               | 5.59             | 51.6    | 103        | 60.8                  | 435               | 20            | 48           |
| 1121    | M97-106              | 6     | 33.3               | 76.2     | 47                    | 78.6             | 2.3        | 1            | 11.2               | 5.66             | 50.7    | 97         | 60.1                  | 391               | 27            | 44           |
| 1122    | M97-38               | 6     | 35.7               | 85.2     | 41                    | 77.5             | 2.3        | 2            | 12.1               | 5.06             | 43.6    | 119        | 50.2                  | 410               | 40            | 15           |
| 1123    | M97-40               | 6     | 36.0               | 83.8     | 44                    | 77.9             | 2.1        | 2            | 11.8               | 5.28             | 47.1    | 126        | 53.5                  | 269               | 38            | 21           |
| 1124    | M97-46               | 6     | 36.5               | 86.0     | 45                    | 77.8             | 2.3        | 2            | 11.7               | 5.26             | 48.1    | 125        | 55.5                  | 255               | 35            | 28           |
| 1125    | M97-47               | 6     | 35.1               | 81.3     | 38                    | 77.2             | n.d.       | 3            | 12.0               | 5.05             | 43.9    | 121        | 53.1                  | 357               | 39            | 17           |
| 1126    | M97-54               | 6     | 34.3               | 79.1     | 41                    | 78.4             | 2.5        | 1            | 10.6               | 5.49             | 55.7    | 83         | 63.2                  | 348               | 29            | 38           |
| 1127    | M97-55               | 6     | 37.0               | 84.7     | 46                    | 78.9             | 2.6        | 1            | 11.0               | 5.66             | 53.7    | 93         | 63.4                  | 280               | 32            | 32           |
| 1128    | M97-56               | 6     | 35.2               | 80.3     | 43                    | 79.1             | 2.6        | 1            | 11.2               | 5.76             | 53.3    | 96         | 64.1                  | 286               | 35            | 28           |
| 1129    | M97-57               | 6     | 36.2               | 83.6     | 45                    | 78.8             | 2.2        | 1            | 11.4               | 5.50             | 49.4    | 108        | 60.8                  | 304               | 29            | 38           |
| 1130    | M97-58               | 6     | 34.5               | 80.1     | 44                    | 78.3             | 2.2        | 1            | 12.0               | 5.51             | 48.0    | 103        | 61.4                  | 406               | 29            | 38           |
| 1131    | M97-107              | 6     | 34.0               | 78.9     | 45                    | 79.2             | 2.1        | 1            | 10.8               | 5.07             | 48.7    | 113        | 66.0                  | 218               | 39            | 17           |
| 1132    | M97-109              | 6     | 34.3               | 78.6     | 41                    | 78.1             | 2.5        | 1            | 11.8               | 5.51             | 49.6    | 109        | 64.8                  | 224               | 32            | 32           |
| 1134    | M97-114              | 6     | 34.1               | 73.5     | 48                    | 77.7             | 2.2        | 1            | 11.4               | 5.42             | 49.6    | 123        | 65.8                  | 174               | 26            | 46           |
| 1135    | M97-115              | 6     | 32.3               | 72.0     | 42                    | 77.6             | 2.1        | 1            | 11.7               | 5.39             | 48.7    | 126        | 65.8                  | 263               | 26            | 46           |
| 1136    | ROBUST               | 6     | 35.3               | 81.3     | 44                    | 77.9             | 2.1        | 1            | 11.1               | 5.31             | 50.5    | 134        | 58.3                  | 166               | 36            | 23           |
| 1137    | STANDER              | 6     | 35.4               | 85.1     | 42                    | 79.2             | 2.4        | 1            | 11.0               | 5.49             | 53.1    | 113        | 77.1                  | 137               | 39            | 17           |

Table 19

| Lab No.                   | Variety or Selection | Rowed | Kernel Weight (mg) | on 6/64" | Barley Color (Agtron) | Malt Extract (%) | Wort Color | Wort Clarity | Barley Protein (%) | Wort Protein (%) | S/T (%) | DP (°ASBC) | Alpha-amylase (20°DU) | Beta-glucan (ppm) | Quality Score | Overall Rank |
|---------------------------|----------------------|-------|--------------------|----------|-----------------------|------------------|------------|--------------|--------------------|------------------|---------|------------|-----------------------|-------------------|---------------|--------------|
| 1138                      | LACEY                | 6     | 35.6               | 83.0     | 42                    | 77.9             | 1.9        | 1            | 11.6               | 4.82             | 43.6    | 131        | 57.0                  | 99                | 49            | 5            |
| 1139                      | M97-16               | 6     | 34.3               | 83.2     | 44                    | 77.5             | 1.8        | 1            | 12.4               | 4.80             | 41.1    | 171        | 53.2                  | 133               | 48            | 7            |
| 1140                      | M97-17               | 6     | 33.6               | 74.9     | 45                    | 77.3             | 1.9        | 1            | 11.5               | 4.81             | 43.2    | 145        | 55.4                  | 143               | 50            | 4            |
| 1141                      | M97-18               | 6     | 35.2               | 84.5     | 45                    | 77.1             | 2.1        | 1            | 11.2               | 4.72             | 43.6    | 157        | 54.9                  | 129               | 55            | 1            |
| 1142                      | M97-19               | 6     | 35.3               | 80.0     | 41                    | 77.5             | 1.9        | 1            | 11.8               | 5.00             | 44.5    | 144        | 56.3                  | 92                | 52            | 2            |
| 1143                      | M97-20               | 6     | 33.5               | 79.7     | 43                    | 77.3             | 1.7        | 1            | 12.2               | 4.87             | 42.6    | 162        | 52.7                  | 143               | 52            | 2            |
| 1144                      | M97-32               | 6     | 36.8               | 85.2     | 44                    | 78.3             | 2.2        | 1            | 11.0               | 5.41             | 52.8    | 141        | 66.8                  | 76                | 39            | 17           |
| 1145                      | M97-34               | 6     | 34.2               | 78.8     | 47                    | 78.7             | 2.3        | 1            | 11.0               | 5.49             | 52.1    | 131        | 71.9                  | 99                | 40            | 15           |
| 1146                      | M97-50               | 6     | 35.5               | 78.7     | 49                    | 78.3             | 2.3        | 1            | 11.1               | 5.42             | 51.5    | 105        | 72.1                  | 97                | 36            | 23           |
| 1147                      | M97-51               | 6     | 36.5               | 84.7     | 45                    | 77.4             | 2.3        | 2            | 11.5               | 4.65             | 42.7    | 130        | 54.1                  | 167               | 47            | 9            |
| 1148                      | M97-53               | 6     | 34.8               | 80.8     | 45                    | 77.8             | n.d.       | 3            | 11.2               | 4.81             | 44.5    | 141        | 52.7                  | 161               | 49            | 5            |
| 1149                      | M97-87               | 6     | 36.1               | 83.4     | 46                    | 77.2             | 2.0        | 2            | 11.9               | 4.72             | 41.8    | 130        | 51.3                  | 237               | 43            | 10           |
| 1150                      | M97-88               | 6     | 35.6               | 82.3     | 46                    | 78.3             | 2.1        | 1            | 11.2               | 5.44             | 51.0    | 117        | 70.1                  | 149               | 36            | 23           |
| 1151                      | M97-90               | 6     | 35.7               | 78.7     | 47                    | 77.7             | 2.3        | 2            | 11.3               | 4.90             | 46.6    | 118        | 57.8                  | 186               | 35            | 28           |
| 1152                      | M97-117              | 6     | 32.5               | 71.8     | 45                    | 77.6             | 2.3        | 2            | 10.8               | 4.47             | 42.4    | 136        | 51.3                  | 178               | 38            | 21           |
| 1153                      | M97-118              | 6     | 35.9               | 78.7     | 38                    | 77.7             | 2.0        | 1            | 11.7               | 4.84             | 42.7    | 140        | 51.8                  | 218               | 48            | 7            |
| 1154                      | M97-119              | 6     | 35.9               | 84.5     | 43                    | 78.3             | 2.3        | 1            | 11.7               | 5.39             | 47.3    | 110        | 62.7                  | 231               | 32            | 32           |
| 1155                      | M97-120              | 6     | 35.3               | 81.0     | 48                    | 77.9             | n.d.       | 3            | 11.7               | 4.73             | 41.9    | 126        | 54.1                  | 170               | 42            | 12           |
| 1112                      | MOREX MALT CHECK     | 6     | 30.7               | 68.8     | 71                    | 79.2             | 1.8        | 1            | 12.1               | 6.02             | 52.5    | 135        | 70.9                  | 104               | 34            |              |
| 1133                      | MOREX MALT CHECK     | 6     | 32.5               | 73.9     | 71                    | 79.3             | 1.6        | 1            | 12.7               | 5.67             | 46.3    | 150        | 69.4                  | 87                | 39            |              |
| 1156                      | MOREX MALT CHECK     | 6     | 31.6               | 74.0     | 73                    | 79.5             | 1.6        | 1            | 11.6               | 5.76             | 50.2    | 142        | 69.6                  | 98                | 43            |              |
| Minima                    |                      |       | 32.3               | 71.8     | 38                    | 76.9             | 1.7        |              | 10.6               | 4.47             | 41.1    | 83         | 46.3                  | 76                | 20            |              |
| Maxima                    |                      |       | 37.0               | 86.2     | 49                    | 79.3             | 2.6        |              | 12.4               | 6.03             | 55.7    | 171        | 77.1                  | 438               | 55            |              |
| Means                     |                      |       | 34.9               | 80.4     | 44                    | 78.1             | 2.2        |              | 11.5               | 5.27             | 47.9    | 121        | 59.8                  | 246               | 37            |              |
| Standard Deviations       |                      |       | 1.2                | 3.8      | 2                     | 0.6              | 0.2        |              | 0.4                | 0.36             | 4.0     | 19         | 6.8                   | 104               | 8             |              |
| Coefficients of Variation |                      |       | 3.4                | 4.8      | 6                     | 0.8              | 8.9        |              | 3.8                | 6.76             | 8.4     | 16         | 11.4                  | 42                | 22            |              |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by K. Smith, University of Minnesota - St. Paul

## 2000 EARLY GENERATION LINES (GROUP 10) - CROOKSTON, MN

Table 20

| Lab No. | Variety or Selection | Rowed | Kernel | on    | Barley | Malt    | Barley | Wort    | Alpha-  | Beta- | Overall |         |        |         |       |      |
|---------|----------------------|-------|--------|-------|--------|---------|--------|---------|---------|-------|---------|---------|--------|---------|-------|------|
|         |                      |       | Weight | 6/64" | Color  | Extract | Wort   | Protein | Protein | S/T   | DP      | amylase | glucan | Quality | Score | Rank |
| 2894    | M102/LACEY 475       | 6     | 36.5   | 86.9  | 49     | 77.5    | 1.8    | 1       | 12.4    | 5.14  | 43.7    | 161     | 60.4   | 142     | 45    | 4    |
| 2895    | M102/LACEY 477       | 6     | 35.1   | 72.6  | 53     | 76.4    | 1.9    | 1       | 12.0    | 5.00  | 43.1    | 148     | 61.8   | 155     | 42    | 6    |
| 2896    | M102/LACEY 479       | 6     | 35.1   | 74.2  | 52     | 76.3    | 2.1    | 1       | 12.6    | 5.21  | 41.9    | 147     | 65.7   | 134     | 41    | 7    |
| 2897    | M102/LACEY 481       | 6     | 36.2   | 85.9  | 54     | 77.7    | 2.2    | 1       | 12.4    | 5.49  | 44.7    | 132     | 70.9   | 105     | 41    | 7    |
| 2898    | ROBUST               | 6     | 35.2   | 76.4  | 47     | 77.1    | 1.9    | 1       | 12.4    | 5.33  | 44.6    | 139     | 55.2   | 195     | 39    | 10   |
| 2899    | M102/LACEY 485       | 6     | 34.3   | 68.9  | 49     | 76.4    | 2.0    | 1       | 11.7    | 5.03  | 44.7    | 138     | 62.8   | 191     | 36    | 13   |
| 2900    | M102/LACEY 487       | 6     | 35.8   | 80.5  | 50     | 78.0    | 2.1    | 1       | 11.8    | 5.56  | 48.0    | 118     | 67.8   | 103     | 36    | 13   |
| 2901    | M102/LACEY 491       | 6     | 34.8   | 76.6  | 45     | 77.9    | 2.0    | 1       | 11.6    | 5.12  | 46.1    | 121     | 62.1   | 109     | 34    | 20   |
| 2902    | M102/LACEY 493       | 6     | 35.3   | 80.5  | 51     | 77.5    | 2.1    | 1       | 12.1    | 5.60  | 48.5    | 128     | 66.8   | 144     | 32    | 24   |
| 2903    | STANDER              | 6     | 35.2   | 78.1  | 48     | 78.7    | 2.4    | 1       | 11.0    | 5.59  | 52.1    | 105     | 79.7   | 102     | 36    | 13   |
| 2904    | M102/LACEY 495       | 6     | 34.3   | 69.7  | 47     | 77.3    | 1.9    | 1       | 11.8    | 4.95  | 45.3    | 138     | 55.8   | 186     | 40    | 9    |
| 2906    | LACEY                | 6     | 34.5   | 74.7  | 45     | 78.1    | 1.9    | 1       | 12.6    | 5.12  | 41.9    | 141     | 59.6   | 124     | 49    | 1    |
| 2907    | M102/LACEY 497       | 6     | 36.4   | 78.3  | 47     | 77.4    | 2.0    | 1       | 12.4    | 5.32  | 44.0    | 152     | 59.2   | 129     | 48    | 2    |
| 2908    | M102/LACEY 499       | 6     | 34.5   | 73.0  | 45     | 77.4    | 2.1    | 1       | 13.0    | 5.34  | 41.7    | 116     | 61.5   | 391     | 23    | 39   |
| 2909    | M102/LACEY 501       | 6     | 35.4   | 73.8  | 49     | 78.5    | 2.3    | 1       | 12.6    | 6.06  | 48.9    | 124     | 69.3   | 142     | 26    | 32   |
| 2910    | M102/LACEY 503       | 6     | 33.3   | 74.1  | 49     | 77.8    | 1.9    | 1       | 12.8    | 5.25  | 42.6    | 115     | 61.3   | 461     | 27    | 29   |
| 2911    | M102/LACEY 505       | 6     | 34.0   | 71.0  | 48     | 78.0    | 2.1    | 1       | 12.8    | 5.66  | 45.4    | 116     | 62.2   | 395     | 27    | 29   |
| 2912    | M102/LACEY 509       | 6     | 32.6   | 63.6  | 47     | 76.4    | 2.6    | 2       | 13.1    | 5.08  | 40.1    | 117     | 55.0   | 320     | 30    | 26   |
| 2913    | M102/LACEY 511       | 6     | 36.0   | 77.2  | 51     | 76.7    | 2.3    | 1       | 13.6    | 5.54  | 42.4    | 133     | 57.8   | 216     | 36    | 13   |
| 2914    | M102/LACEY 513       | 6     | 34.6   | 76.2  | 51     | 76.6    | 2.4    | 2       | 13.2    | 5.04  | 38.3    | 117     | 56.7   | 429     | 25    | 37   |
| 2915    | M102/LACEY 515       | 6     | 32.9   | 66.1  | 47     | 77.6    | 2.6    | 2       | 12.3    | 4.97  | 41.7    | 126     | 56.2   | 253     | 35    | 18   |
| 2916    | M102/LACEY 517       | 6     | 34.6   | 72.5  | 49     | 76.1    | 2.5    | 1       | 12.7    | 5.06  | 42.7    | 118     | 55.9   | 390     | 31    | 25   |
| 2917    | M102/LACEY 519       | 6     | 34.4   | 74.8  | 46     | 76.7    | 2.7    | 2       | 12.8    | 5.24  | 42.7    | 116     | 62.4   | 308     | 26    | 32   |
| 2918    | M102/LACEY 521       | 6     | 33.2   | 66.9  | 51     | 76.6    | 2.6    | 2       | 12.5    | 4.95  | 41.8    | 133     | 56.7   | 314     | 36    | 13   |
| 2919    | M102/LACEY 523       | 6     | 34.4   | 74.0  | 50     | 77.0    | 2.5    | 1       | 12.1    | 5.54  | 47.7    | 99      | 67.8   | 291     | 26    | 32   |
| 2920    | M103/M94-5 527       | 6     | 35.1   | 80.2  | 47     | 77.1    | n.d.   | 3       | 12.8    | 5.24  | 42.1    | 132     | 57.6   | 154     | 38    | 12   |
| 2921    | M103/M94-5 529       | 6     | 35.3   | 80.0  | 49     | 76.5    | 2.4    | 1       | 12.4    | 5.32  | 43.7    | 150     | 61.5   | 140     | 44    | 5    |
| 2922    | M103/M94-5 531       | 6     | 36.1   | 77.0  | 49     | 76.2    | n.d.   | 3       | 12.1    | 4.98  | 42.4    | 133     | 53.8   | 260     | 46    | 3    |
| 2923    | M103/M94-5 533       | 6     | 35.1   | 75.9  | 48     | 77.0    | 2.4    | 1       | 11.9    | 5.52  | 47.7    | 124     | 69.9   | 237     | 26    | 32   |
| 2924    | M103/M94-5 535       | 6     | 37.7   | 84.2  | 53     | 77.5    | 2.6    | 1       | 12.1    | 5.97  | 51.1    | 119     | 68.1   | 182     | 28    | 28   |

Table 20

| Lab No.                   | Variety or Selection | Rowed | Kernel | on    | Barley | Malt    | Barley | Wort | Alpha-  | Beta-   | Overall |         |        |         |       |      |
|---------------------------|----------------------|-------|--------|-------|--------|---------|--------|------|---------|---------|---------|---------|--------|---------|-------|------|
|                           |                      |       | Weight | 6/64" | Color  | Extract | Wort   | Wort | Protein | Protein |         | amylase | glucan | Quality | Score | Rank |
| 2925                      | M103/M94-5 537       | 6     | 36.9   | 76.9  | 52     | 76.4    | 2.4    | 1    | 12.7    | 5.62    | 47.3    | 109     | 60.7   | 355     | 18    | 40   |
| 2927                      | M103/M94-5 539       | 6     | 34.7   | 76.7  | 49     | 76.9    | 2.5    | 1    | 12.0    | 5.44    | 47.0    | 113     | 62.9   | 253     | 26    | 32   |
| 2928                      | M103/M94-5 541       | 6     | 36.3   | 73.4  | 52     | 77.6    | 2.2    | 1    | 10.8    | 5.28    | 49.9    | 129     | 61.5   | 124     | 34    | 20   |
| 2929                      | M103/M94-5 543       | 6     | 34.4   | 69.1  | 51     | 77.3    | 2.3    | 1    | 11.8    | 5.18    | 47.2    | 114     | 62.2   | 275     | 27    | 29   |
| 2930                      | M103/M94-5 545       | 6     | 35.6   | 76.3  | 53     | 77.8    | 2.5    | 1    | 12.4    | 5.89    | 51.5    | 139     | 75.5   | 224     | 30    | 26   |
| 2931                      | M103/M94-5 547       | 6     | 36.3   | 82.5  | 42     | 76.3    | 2.5    | 1    | 12.9    | 5.89    | 46.0    | 147     | 77.5   | 279     | 35    | 18   |
| 2932                      | M103/M94-5 549       | 6     | 37.2   | 82.5  | 46     | 76.2    | 2.2    | 1    | 13.2    | 5.59    | 44.8    | 134     | 58.2   | 366     | 33    | 22   |
| 2933                      | M103/M94-5 551       | 6     | 35.3   | 78.0  | 47     | 76.2    | 2.2    | 1    | 12.4    | 5.42    | 46.9    | 136     | 59.0   | 333     | 33    | 22   |
| 2934                      | M103/M94-5 553       | 6     | 35.3   | 75.1  | 50     | 77.2    | 2.4    | 1    | 12.7    | 5.84    | 48.2    | 135     | 64.7   | 199     | 25    | 37   |
| 2935                      | M103/M94-5 555       | 6     | 35.0   | 75.4  | 47     | 76.1    | 2.6    | 1    | 13.6    | 6.11    | 48.0    | 122     | 64.7   | 272     | 18    | 40   |
| 2936                      | M103/M94-5 557       | 6     | 37.5   | 86.9  | 44     | 76.6    | 2.5    | 1    | 13.5    | 6.17    | 47.6    | 119     | 62.4   | 304     | 17    | 42   |
| 2937                      | M103/M94-5 559       | 6     | 37.3   | 84.6  | 50     | 76.4    | 2.2    | 1    | 13.1    | 5.59    | 42.9    | 140     | 56.8   | 267     | 39    | 10   |
| 2938                      | M103/M94-5 561       | 6     | 36.3   | 75.9  | 46     | 77.0    | 2.5    | 1    | 13.6    | 6.30    | 48.1    | 108     | 66.2   | 316     | 15    | 43   |
| 2939                      | M103/M94-5 563       | 6     | 35.4   | 70.2  | 45     | 77.3    | 2.5    | 1    | 13.0    | 6.03    | 49.9    | 117     | 65.4   | 330     | 15    | 43   |
| 2905                      | MOREX MALT CHECK     | 6     | 30.9   | 71.5  | 72     | 79.9    | 1.7    | 1    | 12.6    | 5.71    | 46.5    | 134     | 66.6   | 123     | 35    |      |
| 2926                      | MOREX MALT CHECK     | 6     | 31.1   | 72.8  | 70     | 79.9    | 1.8    | 1    | 12.0    | 6.06    | 52.7    | 127     | 71.0   | 126     | 33    |      |
| Minima                    |                      |       | 32.6   | 63.6  | 42     | 76.1    | 1.8    |      | 10.8    | 4.95    | 38.3    | 99      | 53.8   | 102     | 15    |      |
| Maxima                    |                      |       | 37.7   | 86.9  | 54     | 78.7    | 2.7    |      | 13.6    | 6.30    | 52.1    | 161     | 79.7   | 461     | 49    |      |
| Means                     |                      |       | 35.3   | 76.1  | 49     | 77.1    | 2.3    |      | 12.5    | 5.44    | 45.4    | 128     | 62.7   | 241     | 32    |      |
| Standard Deviations       |                      |       | 1.2    | 5.4   | 3      | 0.7     | 0.3    |      | 0.6     | 0.37    | 3.2     | 14      | 6.0    | 99      | 9     |      |
| Coefficients of Variation |                      |       | 3.3    | 7.1   | 6      | 0.9     | 11.1   |      | 5.1     | 6.76    | 7.1     | 11      | 9.5    | 41      | 27    |      |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by K. Smith, University of Minnesota - St. Paul

## 2000 EARLY GENERATION LINES (GROUP 11) - CROOKSTON, MN

Table 21

| Lab No. | Variety or Selection | Rowed | Kernel | on    | Barley   | Malt    |       | Barley  | Wort    | S/T     | Alpha- | Beta-   |         |        |         |         |
|---------|----------------------|-------|--------|-------|----------|---------|-------|---------|---------|---------|--------|---------|---------|--------|---------|---------|
|         |                      |       | Weight | 6/64" | Color    | Extract | Wort  | Wort    | Protein | Protein | (%)    | DP      | amylase | glucan | Quality | Overall |
|         |                      |       | (mg)   | (%)   | (Agtron) | (%)     | Color | Clarity | (%)     | (%)     | (%)    | (°ASBC) | (20°DU) | (ppm)  | Score   | Rank    |
| 2940    | M103/M94-5 565       | 6     | 37.4   | 81.7  | 46       | 76.7    | 2.3   | 1       | 13.3    | 5.64    | 44.4   | 143     | 58.8    | 219    | 39      | 5       |
| 2941    | M103/M94-5 567       | 6     | 35.6   | 76.5  | 48       | 77.1    | 2.7   | 1       | 13.3    | 6.32    | 51.1   | 126     | 69.5    | 292    | 18      | 40      |
| 2942    | M103/M94-5 569       | 6     | 34.4   | 71.8  | 47       | 77.2    | 2.4   | 1       | 13.2    | 5.90    | 45.0   | 117     | 68.1    | 306    | 23      | 36      |
| 2943    | M103/M94-5 571       | 6     | 35.5   | 73.6  | 48       | 76.9    | 2.4   | 1       | 12.6    | 5.94    | 50.1   | 119     | 69.8    | 348    | 18      | 40      |
| 2944    | M103/M94-5 573       | 6     | 34.3   | 66.6  | 51       | 75.7    | 2.4   | 1       | 12.4    | 5.43    | 45.1   | 111     | 61.3    | 287    | 28      | 26      |
| 2945    | M103/M94-5 575       | 6     | 35.1   | 79.2  | 52       | 77.8    | 2.3   | 1       | 12.7    | 5.67    | 47.5   | 108     | 67.4    | 327    | 20      | 38      |
| 2946    | M94-33/M94-5 579     | 6     | 34.5   | 74.3  | 50       | 77.4    | 2.5   | 1       | 12.7    | 5.89    | 49.9   | 116     | 65.2    | 295    | 21      | 37      |
| 2948    | M94-33/M94-5 581     | 6     | 37.3   | 81.0  | 49       | 78.8    | 2.7   | 1       | 12.5    | 6.19    | 53.2   | 93      | 67.9    | 293    | 24      | 33      |
| 2949    | M94-33/M94-5 583     | 6     | 35.4   | 76.3  | 50       | 78.0    | 2.3   | 1       | 12.6    | 5.48    | 43.5   | 121     | 63.2    | 406    | 27      | 29      |
| 2950    | M94-33/M94-5 585     | 6     | 37.0   | 79.0  | 48       | 77.3    | 2.9   | 1       | 12.6    | 6.61    | 53.1   | 104     | 67.8    | 245    | 20      | 38      |
| 2951    | ROBUST               | 6     | 33.6   | 69.3  | 44       | 76.5    | 2.0   | 1       | 12.9    | 5.37    | 44.3   | 124     | 51.5    | 335    | 27      | 29      |
| 2952    | M94-33/M94-5 587     | 6     | 36.4   | 76.5  | 51       | 76.6    | 2.5   | 1       | 12.6    | 5.88    | 47.6   | 100     | 64.0    | 309    | 18      | 40      |
| 2953    | M94-33/M94-5 589     | 6     | 35.1   | 73.3  | 49       | 77.4    | 2.0   | 1       | 12.6    | 5.19    | 41.2   | 116     | 56.7    | 255    | 34      | 13      |
| 2954    | M94-33/M94-5 591     | 6     | 36.8   | 78.4  | 44       | 77.3    | 2.8   | 1       | 13.6    | 6.71    | 51.5   | 132     | 67.2    | 162    | 24      | 33      |
| 2955    | STANDER              | 6     | 33.8   | 78.2  | 46       | 78.9    | 2.4   | 1       | 12.4    | 5.73    | 49.4   | 103     | 71.0    | 350    | 29      | 25      |
| 2956    | M94-33/M94-5 593     | 6     | 36.7   | 74.5  | 40       | 77.1    | 2.2   | 1       | 13.3    | 5.41    | 43.1   | 121     | 56.9    | 435    | 27      | 29      |
| 2957    | M94-33/M94-5 595     | 6     | 35.5   | 76.2  | 45       | 77.6    | 2.2   | 1       | 12.4    | 5.45    | 44.5   | 119     | 57.1    | 262    | 35      | 11      |
| 2958    | M94-33/M94-5 597     | 6     | 35.4   | 72.4  | 53       | 77.7    | 2.1   | 1       | 12.1    | 5.26    | 46.1   | 114     | 62.8    | 363    | 27      | 29      |
| 2959    | M94-33/M94-5 599     | 6     | 33.8   | 72.4  | 52       | 76.9    | 2.3   | 1       | 11.7    | 5.07    | 44.5   | 126     | 57.8    | 166    | 39      | 5       |
| 2960    | M94-33/M94-5 609     | 6     | 37.2   | 81.0  | 48       | 77.0    | 2.1   | 1       | 12.2    | 5.03    | 43.3   | 125     | 55.0    | 365    | 38      | 8       |
| 2961    | M94-33/M94-5 611     | 6     | 36.4   | 75.6  | 53       | 78.6    | 2.3   | 1       | 12.1    | 5.70    | 49.5   | 108     | 69.9    | 292    | 30      | 22      |
| 2962    | M94-33/M94-5 613     | 6     | 35.5   | 74.9  | 47       | 79.0    | 2.3   | 1       | 11.5    | 5.73    | 51.3   | 107     | 66.3    | 293    | 33      | 14      |
| 2963    | M94-33/M94-5 615     | 6     | 36.8   | 84.6  | 46       | 78.2    | 2.5   | 1       | 12.1    | 5.93    | 51.6   | 120     | 66.0    | 192    | 32      | 19      |
| 2964    | M94-33/M94-5 617     | 6     | 35.9   | 80.5  | 45       | 77.8    | 2.4   | 1       | 12.0    | 5.82    | 50.9   | 113     | 65.0    | 257    | 28      | 26      |
| 2965    | LACEY MCIA           | 6     | 31.4   | 63.5  | 55       | 79.0    | 1.8   | 1       | 13.1    | 5.83    | 47.2   | 125     | 67.7    | 180    | 24      | 33      |
| 2966    | M94-33/M94-5 621     | 6     | 36.2   | 77.5  | 51       | 77.3    | 2.1   | 1       | 12.8    | 5.08    | 42.5   | 124     | 55.0    | 302    | 33      | 14      |
| 2967    | M94-33/M94-5 625     | 6     | 37.2   | 82.4  | 49       | 77.7    | 2.3   | 1       | 12.2    | 5.61    | 48.6   | 113     | 62.6    | 284    | 28      | 26      |
| 2969    | M94-50/M100 629      | 6     | 34.5   | 74.4  | 47       | 77.8    | 2.0   | 1       | 11.8    | 4.84    | 41.4   | 117     | 52.5    | 256    | 42      | 1       |
| 2970    | M94-50/M100 631      | 6     | 34.6   | 73.8  | 50       | 77.4    | 2.1   | 1       | 11.3    | 4.93    | 45.6   | 120     | 55.1    | 181    | 39      | 5       |
| 2971    | M94-50/M100 633      | 6     | 33.8   | 71.3  | 48       | 78.1    | 2.2   | 1       | 11.5    | 5.48    | 49.9   | 112     | 67.4    | 274    | 30      | 22      |

Table 21

| Lab No.                   | Variety or Selection | Rowed | Kernel | on    | Barley | Malt    |      | Barley | Wort    |         | Alpha- | Beta- |         |        |         |         |
|---------------------------|----------------------|-------|--------|-------|--------|---------|------|--------|---------|---------|--------|-------|---------|--------|---------|---------|
|                           |                      |       | Weight | 6/64" | Color  | Extract | Wort | Wort   | Protein | Protein | S/T    | DP    | amylase | glucan | Quality | Overall |
| 2972                      | M94-50/M100 635      | 6     | 33.2   | 73.8  | 46     | 77.0    | n.d. | 3      | 11.1    | 4.58    | 43.2   | 113   | 54.0    | 298    | 33      | 14      |
| 2973                      | M94-50/M100 637      | 6     | 33.6   | 70.9  | 52     | 78.5    | 2.5  | 2      | 10.8    | 5.00    | 49.0   | 102   | 66.3    | 243    | 33      | 14      |
| 2974                      | M94-50/M100 639      | 6     | 35.1   | 78.1  | 52     | 78.9    | 2.3  | 1      | 11.4    | 5.37    | 47.9   | 101   | 63.9    | 230    | 35      | 11      |
| 2975                      | ROBUST               | 6     | 33.6   | 67.8  | 48     | 77.2    | 1.9  | 1      | 12.2    | 5.06    | 43.4   | 137   | 51.7    | 306    | 40      | 4       |
| 2976                      | M94-50/M100 641      | 6     | 33.9   | 71.7  | 51     | 78.2    | 2.5  | 2      | 11.2    | 5.10    | 45.9   | 98    | 65.7    | 204    | 38      | 8       |
| 2977                      | M94-50/M100 643      | 6     | 34.6   | 78.7  | 49     | 78.2    | 2.4  | 1      | 11.5    | 5.38    | 48.8   | 96    | 63.6    | 244    | 32      | 19      |
| 2978                      | M94-50/M100 645      | 6     | 34.8   | 76.3  | 48     | 77.7    | 2.4  | 2      | 11.9    | 4.73    | 41.9   | 123   | 56.5    | 225    | 38      | 8       |
| 2979                      | M94-50/M100 647      | 6     | 35.2   | 74.1  | 48     | 78.6    | 2.3  | 2      | 11.5    | 4.83    | 43.5   | 125   | 57.0    | 228    | 42      | 1       |
| 2980                      | M94-50/M100 649      | 6     | 35.5   | 79.3  | 48     | 78.0    | 2.2  | 1      | 11.2    | 5.24    | 46.9   | 100   | 66.7    | 199    | 32      | 19      |
| 2981                      | M94-50/M100 651      | 6     | 34.4   | 78.3  | 45     | 77.5    | 2.3  | 1      | 12.1    | 5.35    | 45.1   | 97    | 66.7    | 253    | 33      | 14      |
| 2982                      | M94-50/M100 653      | 6     | 35.6   | 80.6  | 47     | 77.6    | 1.9  | 1      | 11.7    | 5.00    | 44.9   | 118   | 56.7    | 252    | 41      | 3       |
| 2983                      | M94-50/M100 657      | 6     | 33.3   | 73.3  | 50     | 78.3    | 2.4  | 1      | 12.0    | 5.65    | 49.0   | 100   | 66.4    | 265    | 30      | 22      |
| 2947                      | MOREX MALT CHECK     | 6     | 30.7   | 70.2  | 73     | 79.4    | 1.9  | 1      | 12.3    | 5.96    | 51.8   | 131   | 69.3    | 119    | 40      |         |
| 2968                      | MOREX MALT CHECK     | 6     | 31.4   | 71.5  | 72     | 79.6    | 1.7  | 1      | 12.4    | 5.66    | 47.8   | 137   | 65.9    | 125    | 40      |         |
| Minima                    |                      |       | 31.4   | 63.5  | 40     | 75.7    | 1.8  |        | 10.8    | 4.58    | 41.2   | 93    | 51.5    | 162    | 18      |         |
| Maxima                    |                      |       | 37.4   | 84.6  | 55     | 79.0    | 2.9  |        | 13.6    | 6.71    | 53.2   | 143   | 71.0    | 435    | 42      |         |
| Means                     |                      |       | 35.1   | 75.6  | 48     | 77.7    | 2.3  |        | 12.2    | 5.49    | 46.8   | 114   | 62.4    | 273    | 31      |         |
| Standard Deviations       |                      |       | 1.3    | 4.4   | 3      | 0.7     | 0.2  |        | 0.7     | 0.48    | 3.3    | 12    | 5.7     | 62     | 7       |         |
| Coefficients of Variation |                      |       | 3.8    | 5.8   | 6      | 1.0     | 10.4 |        | 5.6     | 8.78    | 7.1    | 10    | 9.2     | 23     | 23      |         |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by K. Smith, University of Minnesota - St. Paul

## 2000 EARLY GENERATION LINES (GROUP 12) - CROOKSTON, MN

Table 22

| Lab No. | Variety or Selection | Rowed | Kernel | on    | Barley   | Malt    |       | Barley  | Wort    | S/T     | Alpha- | Beta-   |         |        |         |         |
|---------|----------------------|-------|--------|-------|----------|---------|-------|---------|---------|---------|--------|---------|---------|--------|---------|---------|
|         |                      |       | Weight | 6/64" | Color    | Extract | Wort  | Wort    | Protein | Protein | (%)    | DP      | amylase | glucan | Quality | Overall |
|         |                      |       | (mg)   | (%)   | (Agtron) | (%)     | Color | Clarity | (%)     | (%)     | (%)    | (°ASBC) | (20°DU) | (ppm)  | Score   | Rank    |
| 2984    | M94-50/M100 659      | 6     | 34.9   | 77.6  | 49       | 77.6    | 2.3   | 2       | 11.4    | 4.76    | 42.4   | 114     | 55.1    | 238    | 40      | 8       |
| 2985    | STANDER              | 6     | 34.2   | 80.1  | 45       | 78.1    | 2.6   | 1       | 12.0    | 5.53    | 48.2   | 105     | 69.6    | 326    | 29      | 25      |
| 2986    | M94-50/M100 661      | 6     | 35.4   | 76.8  | 51       | 77.1    | 2.0   | 1       | 12.0    | 4.89    | 42.4   | 114     | 53.6    | 248    | 42      | 7       |
| 2987    | M94-50/M100 665      | 6     | 33.7   | 72.2  | 48       | 78.1    | 2.0   | 1       | 11.5    | 4.62    | 41.7   | 137     | 57.1    | 194    | 47      | 3       |
| 2988    | M94-50/M100 671      | 6     | 34.6   | 75.1  | 52       | 77.0    | 2.3   | 1       | 11.0    | 5.14    | 47.7   | 105     | 65.9    | 220    | 30      | 22      |
| 2989    | M94-50/M100 673      | 6     | 34.1   | 74.6  | 52       | 77.4    | 2.1   | 1       | 11.9    | 4.99    | 43.4   | 117     | 57.8    | 278    | 39      | 11      |
| 2990    | M94-50/M100 675      | 6     | 35.4   | 80.4  | 54       | 79.0    | 2.1   | 1       | 11.5    | 5.37    | 48.5   | 107     | 64.8    | 292    | 35      | 16      |
| 2992    | LACEY MCIA           | 6     | 31.6   | 64.3  | 54       | 77.5    | 1.8   | 1       | 13.0    | 5.80    | 45.7   | 122     | 80.1    | 216    | 22      | 35      |
| 2993    | ROBUST               | 6     | 31.8   | 57.2  | 47       | 77.8    | 2.6   | 1       | 11.7    | 5.32    | 48.9   | 90      | 65.2    | 367    | 19      | 39      |
| 2994    | M94-191/M100 683     | 6     | 35.0   | 71.0  | 51       | 77.9    | 2.1   | 1       | 11.4    | 5.21    | 47.0   | 103     | 66.2    | 237    | 30      | 22      |
| 2995    | M94-191/M100 685     | 6     | 33.8   | 72.4  | 50       | 78.3    | 1.9   | 1       | 12.1    | 4.96    | 43.1   | 111     | 56.5    | 379    | 40      | 8       |
| 2996    | M94-191/M100 687     | 6     | 33.1   | 70.2  | 51       | 78.3    | 2.0   | 1       | 11.4    | 5.14    | 47.8   | 109     | 67.7    | 334    | 31      | 21      |
| 2997    | M94-191/M100 689     | 6     | 35.0   | 79.1  | 52       | 79.2    | 1.9   | 1       | 10.8    | 4.87    | 45.8   | 109     | 58.9    | 202    | 48      | 2       |
| 2998    | M94-191/M100 691     | 6     | 33.7   | 71.7  | 48       | 79.2    | 2.1   | 1       | 11.5    | 4.68    | 44.0   | 115     | 56.7    | 293    | 46      | 4       |
| 2999    | M94-191/M100 693     | 6     | 34.2   | 70.9  | 50       | 78.0    | 2.3   | 1       | 11.5    | 5.37    | 51.2   | 104     | 71.5    | 187    | 30      | 22      |
| 3000    | M94-191/M100 695     | 6     | 34.4   | 72.5  | 48       | 79.0    | 1.9   | 1       | 12.1    | 4.65    | 40.8   | 115     | 53.8    | 459    | 46      | 4       |
| 3001    | M94-191/M100 697     | 6     | 34.1   | 69.6  | 49       | 77.3    | 2.3   | 1       | 11.9    | 5.50    | 49.0   | 101     | 68.9    | 321    | 20      | 36      |
| 3002    | M94-191/M100 699     | 6     | 35.0   | 67.3  | 51       | 77.7    | 2.3   | 1       | 11.9    | 5.55    | 49.8   | 114     | 68.5    | 311    | 20      | 36      |
| 3003    | M94-191/M100 709     | 6     | 34.6   | 73.9  | 50       | 77.4    | 2.1   | 1       | 12.2    | 5.04    | 42.2   | 124     | 59.7    | 253    | 39      | 11      |
| 3004    | M94-191/M100 711     | 6     | 33.3   | 70.9  | 49       | 77.2    | 2.3   | 1       | 12.3    | 5.37    | 45.0   | 106     | 68.2    | 368    | 28      | 26      |
| 3005    | M94-191/M100 713     | 6     | 34.7   | 74.5  | 53       | 77.0    | 2.3   | 2       | 13.0    | 5.25    | 43.4   | 97      | 61.2    | 328    | 26      | 28      |
| 3006    | M94-191/M100 715     | 6     | 35.5   | 72.2  | 50       | 78.0    | 2.3   | 2       | 12.6    | 5.70    | 48.7   | 103     | 72.0    | 257    | 20      | 36      |
| 3007    | M94-191/M100 717     | 6     | 32.7   | 56.7  | 54       | 77.9    | 2.3   | 1       | 11.7    | 5.32    | 49.9   | 99      | 63.8    | 299    | 23      | 32      |
| 3008    | M94-191/M100 719     | 6     | 33.4   | 66.6  | 49       | 77.7    | 2.3   | 2       | 11.5    | 5.12    | 46.7   | 118     | 61.3    | 312    | 23      | 32      |
| 3009    | M94-191/M100 721     | 6     | 35.1   | 75.2  | 48       | 77.6    | 2.1   | 2       | 11.6    | 4.85    | 44.9   | 114     | 54.5    | 323    | 38      | 14      |
| 3010    | M94-191/M100 723     | 6     | 34.5   | 73.1  | 52       | 77.3    | 2.3   | 1       | 12.3    | 5.53    | 47.9   | 110     | 65.0    | 297    | 26      | 28      |
| 3011    | M94-191/M100 725     | 6     | 34.7   | 73.1  | 49       | 79.0    | 2.2   | 1       | 11.6    | 5.17    | 48.1   | 108     | 62.8    | 217    | 37      | 15      |
| 3013    | M94-191/M100 727     | 6     | 34.3   | 76.5  | 52       | 78.0    | 2.2   | 2       | 11.8    | 4.98    | 45.5   | 120     | 57.1    | 320    | 35      | 16      |
| 3014    | M94-191/M100 729     | 6     | 35.1   | 78.2  | 50       | 78.0    | 2.2   | 1       | 12.3    | 5.43    | 47.5   | 100     | 66.3    | 327    | 25      | 31      |
| 3015    | M94-191/M100 731     | 6     | 35.2   | 71.7  | 46       | 77.7    | 2.4   | 1       | 12.9    | 5.55    | 46.1   | 101     | 65.1    | 381    | 18      | 40      |

Table 22

| Lab No.                   | Variety or Selection | Rowed | Kernel | on    | Barley | Malt    | Barley | Wort    | Alpha-  | Beta- | Overall |         |        |         |       |      |
|---------------------------|----------------------|-------|--------|-------|--------|---------|--------|---------|---------|-------|---------|---------|--------|---------|-------|------|
|                           |                      |       | Weight | 6/64" | Color  | Extract | Wort   | Protein | Protein | S/T   | DP      | amylase | glucan | Quality | Score | Rank |
| 3016                      | M94-191/M100 733     | 6     | 33.3   | 64.4  | 50     | 77.9    | 2.0    | 1       | 12.3    | 5.15  | 43.2    | 106     | 55.6   | 424     | 33    | 18   |
| 3017                      | M94-191/M100 735     | 6     | 35.6   | 81.6  | 53     | 77.9    | 2.1    | 2       | 12.1    | 4.89  | 43.5    | 108     | 54.8   | 370     | 40    | 8    |
| 3018                      | M94-191/M100 737     | 6     | 34.7   | 72.4  | 50     | 77.9    | 2.4    | 2       | 11.4    | 5.27  | 48.0    | 95      | 63.5   | 371     | 26    | 28   |
| 3019                      | M94-191/M100 739     | 6     | 34.7   | 67.6  | 50     | 77.9    | 2.0    | 1       | 11.7    | 4.98  | 44.0    | 120     | 54.1   | 293     | 39    | 11   |
| 3020                      | M94-191/M100 741     | 6     | 34.2   | 77.2  | 50     | 78.0    | 2.1    | 2       | 12.0    | 5.12  | 44.0    | 132     | 52.8   | 256     | 51    | 1    |
| 3021                      | M104/M103 745        | 6     | 36.2   | 80.0  | 48     | 77.4    | 2.3    | 2       | 11.3    | 5.05  | 47.0    | 112     | 57.3   | 344     | 32    | 19   |
| 3022                      | M104/M103 747        | 6     | 35.6   | 85.4  | 49     | 79.1    | 2.3    | 1       | 11.2    | 5.36  | 50.8    | 115     | 64.8   | 322     | 32    | 19   |
| 3023                      | M104/M103 749        | 6     | 34.6   | 75.4  | 46     | 77.4    | 2.4    | 1       | 12.1    | 5.32  | 46.0    | 113     | 62.2   | 381     | 28    | 26   |
| 3024                      | ROBUST               | 6     | 31.7   | 57.7  | 43     | 75.8    | 2.1    | 1       | *15.2   | 5.91  | 39.9    | 146     | 52.3   | 432     | 23    | 32   |
| 3025                      | M104/M103 751        | 6     | 31.8   | 75.7  | 53     | 79.0    | 2.3    | 1       | 11.5    | 5.64  | 49.7    | 140     | 59.6   | 263     | 43    | 6    |
| 2991                      | MOREX MALT CHECK     | 6     | 31.3   | 71.0  | 68     | 77.9    | 1.7    | 1       | 12.2    | 5.63  | 47.5    | 128     | 65.5   | 162     | 25    |      |
| 3012                      | MOREX MALT CHECK     | 6     | 31.0   | 69.9  | 69     | 79.7    | 1.9    | 1       | 12.2    | 5.78  | 50.6    | 126     | 67.9   | 183     | 29    |      |
| Minima                    |                      |       | 31.6   | 56.7  | 43     | 75.8    | 1.8    |         | 10.8    | 4.62  | 39.9    | 90      | 52.3   | 187     | 18    |      |
| Maxima                    |                      |       | 36.2   | 85.4  | 54     | 79.2    | 2.6    |         | 13.0    | 5.91  | 51.2    | 146     | 80.1   | 459     | 51    |      |
| Means                     |                      |       | 34.2   | 72.6  | 50     | 77.9    | 2.2    |         | 11.8    | 5.21  | 46.0    | 112     | 61.8   | 306     | 32    |      |
| Standard Deviations       |                      |       | 1.1    | 6.3   | 2      | 0.7     | 0.2    |         | 0.5     | 0.32  | 2.9     | 12      | 6.4    | 67      | 9     |      |
| Coefficients of Variation |                      |       | 3.3    | 8.7   | 5      | 0.9     | 8.2    |         | 4.4     | 6.05  | 6.3     | 11      | 10.3   | 22      | 28    |      |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by K. Smith, University of Minnesota - St. Paul

## 2000 EARLY GENERATION LINES (GROUP 13) - CROOKSTON, MN

Table 23

| Lab No. | Variety or Selection | Rowed    | Kernel | on    | Barley  | Malt    |      | Barley | Wort    |         | Alpha-  | Beta-   |         |        |         |         |
|---------|----------------------|----------|--------|-------|---------|---------|------|--------|---------|---------|---------|---------|---------|--------|---------|---------|
|         |                      |          | Weight | 6/64" | Color   | Extract | Wort | Wort   | Protein | Protein | S/T     | DP      | amylase | glucan | Quality | Overall |
| (mg)    | (%)                  | (Agtron) | (%)    | Color | Clarity | (%)     | (%)  | (%)    | (%)     | (%)     | (°ASBC) | (20°DU) | (ppm)   | Score  | Rank    |         |
| 3255    | M104/M103 753        | 6        | 34.0   | 77.3  | 51      | 78.4    | 2.1  | 1      | 12.2    | 4.89    | 43.6    | 113     | 66.3    | 442    | 38      | 2       |
| 3256    | M104/M103 755        | 6        | 32.8   | 71.3  | 55      | 78.1    | 2.2  | 1      | 11.6    | 4.73    | 44.3    | 118     | 70.8    | 349    | 36      | 3       |
| 3257    | M104/M103 757        | 6        | 32.4   | 69.9  | 50      | 78.0    | 2.0  | 1      | 12.1    | 4.72    | 41.5    | 112     | 65.7    | 409    | 33      | 8       |
| 3258    | M104/M103 759        | 6        | 33.0   | 68.8  | 50      | 78.0    | 2.0  | 1      | 11.8    | 4.66    | 42.6    | 109     | 59.6    | 455    | 33      | 8       |
| 3259    | M104/M103 761        | 6        | 33.6   | 72.7  | 51      | 77.4    | 2.2  | 1      | 12.2    | 4.89    | 42.5    | 113     | 68.6    | 399    | 32      | 11      |
| 3260    | M104/M103 763        | 6        | 33.8   | 72.6  | 45      | 78.0    | 2.1  | 1      | 13.0    | 5.15    | 42.9    | 135     | 73.5    | 441    | 31      | 15      |
| 3261    | ROBUST MCIA          | 6        | 32.4   | 69.0  | *35     | 76.7    | 2.2  | 1      | *17.8   | *6.63   | *37.9   | *192    | 58.9    | 393    | 11      | 40      |
| 3262    | M104/M103 767        | 6        | 33.7   | 69.9  | 48      | 77.6    | 2.2  | 1      | 12.3    | 5.16    | 43.8    | 113     | 58.7    | 439    | 33      | 8       |
| 3263    | M104/M103 769        | 6        | 31.8   | 60.2  | 49      | 77.9    | 2.1  | 1      | 11.6    | 5.00    | 46.0    | 122     | 62.0    | 404    | 23      | 26      |
| 3265    | M104/M103 771        | 6        | 32.0   | 65.7  | 53      | 77.5    | 2.1  | 2      | 11.7    | 5.17    | 46.9    | 108     | 61.9    | 327    | 22      | 29      |
| 3266    | M104/M103 773        | 6        | 33.3   | 64.4  | 46      | 77.0    | 2.2  | 1      | 11.4    | 5.11    | 45.4    | 112     | 63.7    | 277    | 32      | 11      |
| 3267    | M104/M103 775        | 6        | 31.3   | 62.0  | 49      | 77.2    | 2.1  | 1      | 11.9    | 5.22    | 46.0    | 107     | 65.0    | 305    | 28      | 19      |
| 3268    | M104/M103 777        | 6        | 32.5   | 58.5  | 45      | 77.7    | 2.1  | 1      | 12.2    | 5.43    | 47.5    | 109     | 65.5    | 312    | 20      | 31      |
| 3269    | M104/M103 779        | 6        | 33.5   | 67.6  | 46      | 77.3    | 2.1  | 1      | 12.6    | 5.33    | 44.7    | 108     | 64.9    | 455    | 20      | 31      |
| 3270    | M104/M103 781        | 6        | 32.6   | 63.8  | 52      | 77.3    | 2.3  | 1      | 12.4    | 5.57    | 46.2    | 111     | 62.4    | 360    | 20      | 31      |
| 3271    | M104/M103 783        | 6        | 33.8   | 69.7  | 48      | 77.1    | 2.4  | 2      | 13.1    | 5.60    | 43.7    | 118     | 63.4    | 285    | 22      | 29      |
| 3272    | M104/M103 785        | 6        | 33.5   | 67.3  | 50      | 77.4    | 2.1  | 2      | 12.2    | 5.29    | 44.3    | 122     | 73.3    | 360    | 28      | 19      |
| 3273    | M104/M103 787        | 6        | 34.7   | 73.6  | 44      | 77.0    | 2.1  | 1      | 11.9    | 5.19    | 45.9    | 110     | 64.8    | 355    | 32      | 11      |
| 3274    | M104/M103 789        | 6        | 31.9   | 67.4  | 48      | 76.8    | 2.3  | 1      | 12.5    | 5.34    | 44.1    | 133     | 62.6    | 317    | 23      | 26      |
| 3275    | M104/M103 791        | 6        | 32.4   | 64.4  | 45      | 76.6    | 2.3  | 1      | 13.2    | 5.36    | 41.6    | 114     | 63.9    | 341    | 20      | 31      |
| 3276    | M104/M103 793        | 6        | 33.2   | 70.8  | 49      | 77.5    | 2.2  | 1      | 11.7    | 5.17    | 44.2    | 115     | 63.4    | 318    | 32      | 11      |
| 3277    | M104/M103 795        | 6        | 33.3   | 62.7  | 46      | 77.8    | 2.7  | 1      | 11.8    | 5.26    | 46.6    | 114     | 64.4    | 283    | 27      | 21      |
| 3278    | M104/M103 797        | 6        | 32.2   | 63.4  | 48      | 77.2    | 2.7  | 1      | 13.0    | 5.57    | 43.1    | 117     | 62.7    | 375    | 20      | 31      |
| 3279    | M104/M103 799        | 6        | 34.1   | 70.3  | 44      | 76.9    | 2.6  | 1      | 12.8    | 5.52    | 43.6    | 111     | 66.8    | 353    | 23      | 26      |
| 3280    | M104/M103 809        | 6        | 32.4   | 60.0  | 47      | 76.7    | 2.9  | 1      | 13.0    | 5.70    | 45.4    | 127     | 66.0    | 306    | 20      | 31      |
| 3281    | M104/M103 811        | 6        | 32.9   | 67.6  | 50      | 76.7    | 2.6  | 1      | 13.0    | 5.54    | 44.2    | 110     | 65.5    | 423    | 20      | 31      |
| 3282    | M104/M103 813        | 6        | 32.1   | 65.9  | 44      | 77.3    | 2.7  | 1      | 13.5    | 5.79    | 43.6    | 104     | 62.2    | 404    | 20      | 31      |
| 3283    | M104/M103 815        | 6        | 34.0   | 77.1  | 51      | 77.2    | 2.4  | 1      | 12.5    | 5.39    | 44.1    | 124     | 64.5    | 343    | 25      | 24      |
| 3284    | M104/M103 817        | 6        | 33.4   | 66.6  | 49      | 77.6    | 2.5  | 1      | 11.9    | 5.32    | 45.3    | 115     | 65.1    | 372    | 25      | 24      |
| 3285    | M105/LACEY 823       | 6        | 31.3   | 55.6  | 46      | 78.3    | 2.6  | 1      | 12.2    | 5.58    | 47.3    | 113     | 66.4    | 284    | 26      | 23      |

Table 23

| Lab No.                   | Variety or Selection | Rowed | Kernel | on    | Barley | Malt    |      | Barley | Wort    |         | Alpha- | Beta- |         |        |         |         |
|---------------------------|----------------------|-------|--------|-------|--------|---------|------|--------|---------|---------|--------|-------|---------|--------|---------|---------|
|                           |                      |       | Weight | 6/64" | Color  | Extract | Wort | Wort   | Protein | Protein | S/T    | DP    | amylase | glucan | Quality | Overall |
| 3286                      | M105/LACEY 825       | 6     | *28.9  | 48.2  | 42     | 77.8    | 2.9  | 1      | 11.5    | 4.97    | 43.2   | 130   | 54.7    | 243    | 40      | 1       |
| 3288                      | M105/LACEY 827       | 6     | 31.9   | 64.4  | 48     | 77.9    | 2.6  | 1      | 12.3    | 5.43    | 44.6   | 122   | 65.2    | 281    | 27      | 21      |
| 3289                      | M105/LACEY 829       | 6     | 33.8   | 74.8  | 45     | 77.8    | 2.3  | 1      | 11.3    | 5.16    | 46.8   | 107   | 60.4    | 252    | 30      | 16      |
| 3290                      | M105/LACEY 831       | 6     | 31.4   | 57.5  | 46     | 76.8    | 2.4  | 1      | 11.5    | 4.80    | 43.7   | 117   | 53.2    | 342    | 35      | 7       |
| 3291                      | M105/LACEY 833       | 6     | 32.8   | 67.5  | 46     | 77.9    | 2.2  | 1      | 11.8    | 5.17    | 43.8   | 105   | 61.9    | 353    | 29      | 17      |
| 3292                      | M105/LACEY 835       | 6     | 33.3   | 63.2  | 49     | 77.3    | 2.3  | 1      | 12.1    | 5.58    | 49.1   | 109   | 63.3    | 360    | 20      | 31      |
| 3293                      | M105/LACEY 837       | 6     | 33.0   | 79.0  | 53     | 78.1    | 2.3  | 1      | 11.5    | 5.42    | 47.4   | 103   | 64.1    | 354    | 29      | 17      |
| 3294                      | M105/LACEY 839       | 6     | 33.4   | 72.5  | 48     | 77.6    | 2.0  | 1      | 12.0    | 5.05    | 42.3   | 123   | 56.9    | 352    | 36      | 3       |
| 3295                      | M105/LACEY 841       | 6     | 34.7   | 74.9  | 49     | 77.3    | 2.1  | 1      | 12.0    | 5.01    | 43.6   | 127   | 55.7    | 358    | 36      | 3       |
| 3296                      | M105/LACEY 843       | 6     | 30.3   | 60.8  | 49     | 78.1    | 2.0  | 1      | 11.0    | 4.61    | 45.4   | 109   | 57.7    | 326    | 36      | 3       |
| 3264                      | MOREX MALT CHECK     | 6     | 30.6   | 70.3  | 68     | 79.8    | 1.8  | 1      | 12.7    | 5.77    | 46.8   | 122   | 62.1    | 228    | 27      |         |
| 3287                      | MOREX MALT CHECK     | 6     | 31.6   | 72.9  | 69     | 79.0    | 1.9  | 1      | 12.2    | 5.67    | 49.4   | 140   | 64.6    | 129    | 40      |         |
| Minima                    |                      |       | 30.3   | 48.2  | 42     | 76.6    | 2.0  |        | 11.0    | 4.61    | 41.5   | 103   | 53.2    | 243    | 11      |         |
| Maxima                    |                      |       | 34.7   | 79.0  | 55     | 78.4    | 2.9  |        | 13.5    | 5.79    | 49.1   | 135   | 73.5    | 455    | 40      |         |
| Means                     |                      |       | 32.9   | 67.0  | 48     | 77.5    | 2.3  |        | 12.2    | 5.23    | 44.6   | 115   | 63.4    | 353    | 27      |         |
| Standard Deviations       |                      |       | 1.0    | 6.4   | 3      | 0.5     | 0.2  |        | 0.6     | 0.30    | 1.7    | 8     | 4.4     | 55     | 7       |         |
| Coefficients of Variation |                      |       | 3.0    | 9.5   | 6      | 0.6     | 10.6 |        | 4.8     | 5.73    | 3.9    | 7     | 6.9     | 16     | 24      |         |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by K. Smith, University of Minnesota - St. Paul

## 2000 EARLY GENERATION LINES (GROUP 14) - CROOKSTON, MN

Table 24

| Lab No. | Variety or Selection | Rowed    | Kernel | on    | Barley  | Malt    |      | Barley | Wort    |         | Alpha-  | Beta-   |         |        |         |         |
|---------|----------------------|----------|--------|-------|---------|---------|------|--------|---------|---------|---------|---------|---------|--------|---------|---------|
|         |                      |          | Weight | 6/64" | Color   | Extract | Wort | Wort   | Protein | Protein | S/T     | DP      | amylase | glucan | Quality | Overall |
| (mg)    | (%)                  | (Agtron) | (%)    | Color | Clarity | (%)     | (%)  | (%)    | (%)     | (%)     | (°ASBC) | (20°DU) | (ppm)   | Score  | Rank    |         |
| 3297    | M105/LACEY 845       | 6        | 31.0   | 61.1  | 51      | 77.9    | 2.1  | 1      | 10.8    | 5.24    | 50.0    | 99      | 66.2    | 328    | 23      | 28      |
| 3298    | M105/LACEY 847       | 6        | 31.7   | 62.4  | 48      | 77.8    | 2.0  | 1      | 10.6    | 4.60    | 45.9    | 108     | 56.3    | 244    | 28      | 15      |
| 3299    | M105/LACEY 849       | 6        | 33.8   | 80.0  | 53      | 78.3    | 2.2  | 1      | 11.7    | 4.98    | 43.9    | 106     | 60.8    | 311    | 38      | 4       |
| 3300    | M105/LACEY 851       | 6        | 31.6   | 58.1  | 52      | 77.7    | 2.1  | 1      | 11.5    | 4.81    | 41.9    | 107     | 57.8    | 423    | 32      | 10      |
| 3301    | M105/LACEY 853       | 6        | 32.6   | 72.8  | 45      | 78.4    | 2.0  | 1      | 11.6    | 4.94    | 44.8    | 100     | 58.2    | 362    | 40      | 1       |
| 3302    | M105/LACEY 855       | 6        | 32.0   | 63.2  | 51      | 77.8    | 1.9  | 1      | 11.8    | 4.65    | 40.5    | 107     | 54.5    | 403    | 35      | 6       |
| 3303    | M105/LACEY 857       | 6        | 31.2   | 59.3  | 50      | 78.4    | 2.0  | 1      | 11.1    | 4.84    | 45.4    | 120     | 58.6    | 271    | 39      | 3       |
| 3304    | M105/LACEY 861       | 6        | 32.9   | 65.6  | 52      | 78.1    | 2.1  | 1      | 10.8    | 4.62    | 43.1    | 112     | 58.3    | 269    | 40      | 1       |
| 3305    | M105/LACEY 863       | 6        | 34.1   | 81.9  | 43      | 78.3    | 2.4  | 1      | 11.9    | 5.51    | 48.2    | 111     | 63.9    | 285    | 32      | 10      |
| 3306    | M105/LACEY 865       | 6        | 33.1   | 64.7  | 52      | 77.1    | 2.1  | 1      | 11.7    | 4.90    | 43.9    | 120     | 55.9    | 243    | 36      | 5       |
| 3307    | M105/LACEY 867       | 6        | 32.7   | 69.2  | 45      | 78.3    | 2.2  | 1      | 10.9    | 5.03    | 48.9    | 114     | 62.5    | 174    | 31      | 12      |
| 3308    | M105/LACEY 869       | 6        | 31.3   | 65.4  | 48      | 78.8    | 2.1  | 1      | 11.1    | 5.24    | 50.2    | 103     | 66.8    | 306    | 27      | 16      |
| 3309    | M105/LACEY 871       | 6        | 30.7   | 60.1  | 50      | 78.5    | 2.5  | 1      | 11.1    | 5.34    | 48.5    | 103     | 69.8    | 296    | 26      | 22      |
| 3310    | M105/LACEY 873       | 6        | 32.3   | 61.4  | 48      | 77.8    | 2.3  | 1      | 11.5    | 4.89    | 44.1    | 114     | 61.5    | 394    | 29      | 13      |
| 3311    | M105/LACEY 875       | 6        | 32.3   | 65.5  | 48      | 78.0    | 2.2  | 1      | 10.6    | 4.85    | 48.0    | 93      | 68.0    | 261    | 27      | 16      |
| 3312    | M101/M94-126 879     | 6        | 31.5   | 60.5  | 47      | 78.6    | 2.2  | 1      | 11.6    | 5.22    | 48.3    | 110     | 62.3    | 405    | 27      | 16      |
| 3313    | M101/M94-126 881     | 6        | 32.5   | 60.3  | 46      | 78.1    | 2.2  | 1      | 11.9    | 5.34    | 46.5    | 117     | 64.5    | 395    | 24      | 24      |
| 3314    | M101/M94-126 883     | 6        | 33.8   | 65.6  | 50      | 78.2    | 2.1  | 1      | 12.0    | 5.26    | 44.7    | 104     | 64.9    | 522    | 33      | 8       |
| 3315    | M101/M94-126 885     | 6        | 33.8   | 68.2  | 44      | 78.1    | 2.1  | 1      | 11.9    | 5.38    | 46.4    | 112     | 64.9    | 491    | 24      | 24      |
| 3317    | M101/M94-126 887     | 6        | 33.6   | 69.7  | 49      | 78.3    | 2.1  | 1      | 12.2    | 5.41    | 45.7    | 116     | 66.1    | 371    | 29      | 13      |
| 3318    | M101/M94-126 889     | 6        | 34.2   | 72.5  | 46      | 78.5    | 2.1  | 1      | 12.6    | 5.37    | 46.0    | 120     | 68.8    | 397    | 27      | 16      |
| 3319    | M101/M94-126 891     | 6        | 33.5   | 69.4  | 49      | 78.3    | 2.1  | 1      | 12.1    | 5.25    | 45.7    | 110     | 66.4    | 471    | 33      | 8       |
| 3320    | M101/M94-126 893     | 6        | 34.3   | 73.7  | 49      | 78.4    | 2.1  | 1      | 13.0    | 5.61    | 45.0    | 120     | 68.3    | 458    | 27      | 16      |
| 3321    | STANDER              | 6        | 35.1   | 78.1  | 45      | 78.3    | 2.4  | 1      | 13.6    | 6.18    | 46.1    | 125     | 74.2    | 527    | 21      | 31      |
| 3322    | M101/M94-126 895     | 6        | 34.4   | 67.4  | 51      | 77.8    | 2.2  | 1      | 12.7    | 5.55    | 45.1    | 110     | 66.6    | 470    | 20      | 32      |
| 3323    | M101/M94-126 897     | 6        | 33.5   | 69.8  | 48      | 77.9    | 2.4  | 1      | 12.8    | 5.78    | 46.0    | 115     | 68.1    | 385    | 15      | 39      |
| 3324    | M101/M94-126 899     | 6        | 34.4   | 71.5  | 48      | 77.9    | 2.3  | 1      | 12.8    | 5.65    | 44.6    | 108     | 64.4    | 550    | 23      | 28      |
| 3325    | ROBUST               | 6        | 34.1   | 71.5  | 51      | 77.5    | 1.9  | 1      | 13.2    | 5.44    | 41.7    | *139    | 52.9    | 500    | 34      | 7       |
| 3326    | M101/M94-126 909     | 6        | 33.7   | 68.7  | 46      | 78.1    | 2.0  | 1      | 11.9    | 5.39    | 46.6    | 122     | 66.9    | 377    | 24      | 24      |
| 3327    | M101/M94-126 911     | 6        | 32.4   | 63.2  | 46      | 78.1    | 2.2  | 1      | 13.2    | 5.81    | 44.7    | 118     | 67.5    | 446    | 24      | 24      |

Table 24

| Lab No.                   | Variety or Selection | Rowed | Kernel | on    | Barley | Malt    | Barley | Wort | Alpha-  | Beta-   | Overall |         |        |       |      |    |
|---------------------------|----------------------|-------|--------|-------|--------|---------|--------|------|---------|---------|---------|---------|--------|-------|------|----|
|                           |                      |       | Weight | 6/64" | Color  | Extract | Wort   | Wort | Protein | Protein |         | amylase | glucan | Score | Rank |    |
| 3328                      | M101/M94-126 913     | 6     | 32.1   | 58.8  | 47     | 77.2    | 2.6    | 1    | 13.6    | 6.01    | 46.2    | 114     | 66.8   | 403   | 12   | 42 |
| 3329                      | M101/M94-126 915     | 6     | *36.9  | 82.4  | 49     | 77.8    | 2.6    | 1    | 12.0    | 5.59    | 49.4    | 112     | 67.9   | 331   | 25   | 23 |
| 3330                      | M101/M94-126 917     | 6     | 34.3   | 76.9  | 49     | 78.2    | 2.3    | 1    | 13.0    | 5.68    | 44.9    | 112     | 65.0   | 423   | 27   | 16 |
| 3331                      | M101/M94-126 919     | 6     | 31.9   | 56.5  | 46     | 77.3    | 2.6    | 1    | 12.4    | 5.66    | 47.2    | 102     | 63.5   | 425   | 19   | 37 |
| 3332                      | M101/M94-126 921     | 6     | 33.8   | 73.3  | 44     | 78.0    | 2.4    | 1    | 13.4    | 5.87    | 46.0    | 97      | 61.1   | 492   | 23   | 28 |
| 3333                      | M101/M94-126 923     | 6     | 33.4   | 59.2  | 48     | 77.1    | 2.5    | 1    | 13.1    | 5.78    | 46.6    | 97      | 66.9   | 501   | 15   | 39 |
| 3334                      | M101/M94-126 925     | 6     | 33.0   | 65.8  | 48     | 76.8    | 2.5    | 1    | 13.7    | 5.86    | 45.2    | 105     | 63.7   | 444   | 20   | 32 |
| 3335                      | M101/M94-126 927     | 6     | 32.3   | 56.2  | 42     | 76.2    | 2.7    | 1    | 13.9    | 5.99    | 44.8    | 99      | 67.2   | 494   | 20   | 32 |
| 3336                      | M101/M94-126 929     | 6     | 30.5   | 53.7  | 48     | 76.8    | 2.7    | 1    | 14.0    | 6.10    | 44.7    | 112     | 64.9   | 433   | 16   | 38 |
| 3338                      | M101/M94-126 931     | 6     | 31.5   | 60.1  | 48     | 76.7    | 2.6    | 1    | 14.1    | 6.16    | 44.9    | 113     | 66.9   | 462   | 11   | 44 |
| 3339                      | M101/M94-126 933     | 6     | 33.5   | 69.3  | 47     | 77.1    | 2.6    | 1    | 14.2    | 6.06    | 45.4    | 111     | 64.5   | 455   | 12   | 42 |
| 3340                      | M101/M94-126 935     | 6     | 31.3   | 57.7  | 48     | 77.0    | 2.5    | 1    | 14.2    | 6.22    | 46.7    | 110     | 66.8   | 461   | 6    | 45 |
| 3341                      | M101/M94-126 937     | 6     | 33.6   | 64.6  | 45     | 77.8    | 2.2    | 1    | 12.3    | 5.61    | 48.3    | 108     | 68.5   | 462   | 20   | 32 |
| 3342                      | M101/M94-126 939     | 6     | 32.1   | 54.1  | 50     | 77.8    | 2.3    | 1    | 12.7    | 5.68    | 47.5    | 112     | 68.2   | 479   | 15   | 39 |
| 3343                      | M101/M94-126 941     | 6     | 32.0   | 62.1  | 51     | 77.7    | 2.3    | 1    | 12.9    | 5.64    | 45.4    | 117     | 66.8   | 483   | 20   | 32 |
| 3316                      | MOREX MALT CHECK     | 6     | 32.1   | 72.8  | 68     | 79.5    | 1.7    | 1    | 12.4    | 5.68    | 48.4    | 135     | 68.2   | 161   | 37   |    |
| 3337                      | MOREX MALT CHECK     | 6     | 31.4   | 72.6  | 67     | 79.5    | 1.7    | 1    | 12.6    | 5.61    | 47.9    | 129     | 71.6   | 172   | 27   |    |
| Minima                    |                      |       | 30.5   | 53.7  | 42     | 76.2    | 1.9    |      | 10.6    | 4.60    | 40.5    | 93      | 52.9   | 174   | 6    |    |
| Maxima                    |                      |       | 35.1   | 82.4  | 53     | 78.8    | 2.7    |      | 14.2    | 6.22    | 50.2    | 125     | 74.2   | 550   | 40   |    |
| Means                     |                      |       | 32.8   | 66.0  | 48     | 77.8    | 2.3    |      | 12.3    | 5.44    | 45.9    | 110     | 64.3   | 402   | 25   |    |
| Standard Deviations       |                      |       | 1.2    | 7.2   | 3      | 0.6     | 0.2    |      | 1.0     | 0.45    | 2.1     | 7       | 4.4    | 90    | 8    |    |
| Coefficients of Variation |                      |       | 3.5    | 10.9  | 5      | 0.7     | 9.7    |      | 8.5     | 8.20    | 4.5     | 7       | 6.9    | 22    | 32   |    |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by K. Smith, University of Minnesota - St. Paul

## 2000 EARLY GENERATION LINES (GROUP 15) - CROOKSTON, MN

Table 25

| Lab No. | Variety or Selection | Rowed | Kernel | on    | Barley | Malt    |      | Barley | Wort    | S/T     | Alpha- | Beta- | Overall |        |       |      |
|---------|----------------------|-------|--------|-------|--------|---------|------|--------|---------|---------|--------|-------|---------|--------|-------|------|
|         |                      |       | Weight | 6/64" | Color  | Extract | Wort | Wort   | Protein | Protein | (%)    | DP    | amylase | glucan | Score | Rank |
| 3344    | M101/M94-126 943     | 6     | 32.2   | 66.9  | 49     | 77.4    | 2.4  | 1      | 13.6    | 5.89    | 46.1   | 108   | 64.0    | 492    | 15    | 45   |
| 3345    | M101/M94-126 945     | 6     | 34.6   | 73.7  | 49     | 77.7    | 2.2  | 1      | 12.7    | 5.54    | 46.2   | 104   | 65.1    | 426    | 18    | 44   |
| 3346    | M101/M94-126 947     | 6     | 33.6   | 66.2  | 53     | 77.3    | 2.3  | 1      | 12.8    | 5.41    | 43.5   | 114   | 66.5    | 449    | 20    | 42   |
| 3347    | M101/M94-126 949     | 6     | 33.5   | 67.3  | 42     | 78.3    | 2.1  | 1      | 11.7    | 5.36    | 46.7   | 112   | 68.0    | 330    | 24    | 29   |
| 3348    | GD6-33/M105 953      | 6     | 30.7   | 41.2  | 48     | 77.3    | 2.3  | 1      | 12.5    | 5.20    | 44.1   | 118   | 79.4    | 352    | 28    | 19   |
| 3349    | GD6-33/M105 955      | 6     | 31.8   | 53.4  | 45     | 77.5    | 2.3  | 1      | 12.9    | 5.19    | 42.8   | 109   | 83.6    | 520    | 23    | 34   |
| 3350    | GD6-33               | 6     | 33.4   | 61.3  | 50     | 80.1    | 2.5  | 1      | 12.5    | 5.70    | 47.1   | 134   | 81.4    | 153    | 32    | 9    |
| 3351    | GD6-33/M105 957      | 6     | 32.5   | 56.7  | 47     | 79.3    | 2.4  | 1      | 12.1    | 5.78    | 49.9   | 121   | 77.4    | 262    | 30    | 17   |
| 3352    | GD6-33/M105 959      | 6     | 32.9   | 59.1  | 49     | 78.9    | 2.3  | 1      | 11.5    | 5.23    | 48.1   | 126   | 84.4    | 245    | 31    | 11   |
| 3353    | GD6-33/M105 961      | 6     | 31.5   | 47.6  | 52     | 77.8    | 2.3  | 1      | 11.3    | 5.02    | 48.8   | 121   | 80.6    | 411    | 23    | 34   |
| 3354    | GD6-33/105 963       | 6     | 32.4   | 57.9  | 46     | 77.7    | 2.3  | 1      | 11.5    | 5.06    | 47.0   | 98    | 70.8    | 347    | 24    | 29   |
| 3355    | GD6-33/M105 965      | 6     | 31.2   | 44.1  | 46     | 78.2    | 2.4  | 1      | 11.0    | 4.90    | 45.5   | 119   | 79.9    | 418    | 32    | 9    |
| 3356    | GD6-33/M105 967      | 6     | 30.9   | 48.6  | 48     | 78.9    | 2.2  | 1      | 11.7    | 5.16    | 46.2   | 117   | 68.2    | 499    | 27    | 26   |
| 3357    | GD6-33/M105 969      | 6     | 31.0   | 59.6  | 45     | 76.5    | 2.2  | 1      | 12.1    | 5.01    | 44.7   | 106   | 71.2    | 464    | 28    | 19   |
| 3358    | GD6-33/M105 971      | 6     | 31.2   | 53.8  | 47     | 78.3    | 2.3  | 1      | 11.7    | 5.30    | 45.7   | 127   | 80.7    | 329    | 28    | 19   |
| 3360    | GD6-33/M105 973      | 6     | 30.9   | 55.3  | 48     | 79.1    | 2.4  | 1      | 11.7    | 5.05    | 46.0   | 115   | 71.6    | 260    | 33    | 5    |
| 3361    | GD6-33/M105 977      | 6     | 31.6   | 48.4  | 46     | 78.4    | 2.9  | 2      | 11.4    | 4.98    | 47.3   | 103   | 81.9    | 357    | 26    | 28   |
| 3362    | GD6-33/105 979       | 6     | 31.1   | 53.2  | 42     | 78.6    | 2.4  | 1      | 11.8    | 5.39    | 48.3   | 102   | 75.5    | 325    | 23    | 34   |
| 3363    | GD6-33/M105 981      | 6     | 31.2   | 56.4  | 50     | 77.3    | 2.1  | 1      | 12.2    | 4.96    | 42.1   | 109   | 64.9    | 553    | 28    | 19   |
| 3364    | GD6-33/M105 983      | 6     | 30.5   | 61.7  | 46     | 79.7    | 2.4  | 1      | 10.8    | 4.93    | 50.1   | 84    | 81.8    | 322    | 30    | 17   |
| 3365    | GD6-33/M105 985      | 6     | 31.6   | 51.8  | 45     | 78.5    | 2.5  | 1      | 10.5    | 4.78    | 48.1   | 106   | 80.4    | 338    | 22    | 40   |
| 3366    | GD6-33/M105 987      | 6     | 29.6   | 49.4  | 46     | 79.6    | 2.6  | 1      | 10.8    | 5.04    | 50.1   | 107   | 87.7    | 163    | 31    | 11   |
| 3367    | GD6-33/M105 989      | 6     | 30.7   | 52.0  | 46     | 79.6    | 2.4  | 1      | 11.1    | 5.10    | 48.5   | 100   | 84.4    | 252    | 33    | 5    |
| 3368    | GD6-33/M105 991      | 6     | 31.5   | 56.6  | 45     | 79.0    | 2.4  | 1      | 10.5    | 4.53    | 47.3   | 83    | 71.8    | 258    | 21    | 41   |
| 3369    | GD6-33/M105 993      | 6     | 30.6   | 57.4  | 49     | 78.0    | 2.4  | 1      | 11.3    | 4.95    | 44.8   | 94    | 77.3    | 355    | 28    | 19   |
| 3370    | GD6-33               | 6     | 32.3   | 58.3  | 48     | 80.5    | 2.4  | 1      | 11.0    | 5.29    | 50.2   | 118   | 84.1    | 88     | 41    | 1    |
| 3371    | GD6-33/M105 995      | 6     | 33.5   | 67.4  | 48     | 78.6    | 2.8  | 1      | 10.9    | 4.77    | 46.9   | 94    | 68.7    | 405    | 28    | 19   |
| 3372    | GD6-33/M105 997      | 6     | 29.4   | 44.7  | 44     | 79.1    | 2.4  | 1      | 11.1    | 5.16    | 49.1   | 95    | 74.6    | 234    | 31    | 11   |
| 3373    | GD6-33/M105 999      | 6     | 34.0   | 71.2  | 48     | 78.4    | 2.4  | 1      | 10.9    | 4.95    | 48.1   | 96    | 69.6    | 468    | 31    | 11   |
| 3374    | GD6-33/M105 1009     | 6     | 31.1   | 56.9  | 53     | 78.0    | 2.1  | 1      | 11.4    | 4.81    | 45.7   | 107   | 61.4    | 350    | 28    | 19   |

Table 25

| Lab No.                   | Variety or Selection | Rowed | Kernel | on    | Barley | Malt    | Barley | Wort    | Alpha-  | Beta- | Overall |         |        |         |       |      |
|---------------------------|----------------------|-------|--------|-------|--------|---------|--------|---------|---------|-------|---------|---------|--------|---------|-------|------|
|                           |                      |       | Weight | 6/64" | Color  | Extract | Wort   | Protein | Protein | S/T   | DP      | amylase | glucan | Quality | Score | Rank |
| 3375                      | GD6-33/M105 1011     | 6     | 32.2   | 69.9  | 47     | 78.7    | 2.6    | 1       | 11.0    | 4.71  | 45.3    | 74      | 70.2   | 495     | 33    | 5    |
| 3376                      | GD7-30/M103 1015     | 6     | 31.8   | 49.1  | 48     | 77.4    | 2.4    | 1       | 11.4    | 5.17  | 47.1    | 89      | 66.0   | 303     | 23    | 34   |
| 3377                      | GD7-30/M103 1017     | 6     | 31.8   | 44.9  | 43     | 76.8    | 2.9    | 1       | 11.1    | 4.86  | 46.4    | 78      | 63.9   | 442     | 23    | 34   |
| 3378                      | GD7-30/M103 1019     | 6     | 34.2   | 71.4  | 43     | 78.3    | 2.2    | 1       | 12.2    | 5.24  | 44.1    | 91      | 66.3   | 515     | 36    | 3    |
| 3379                      | GD7-30/M103 1021     | 6     | 31.5   | 54.5  | 50     | 76.9    | 2.6    | 1       | 11.6    | 5.04  | 46.9    | 75      | 67.6   | 405     | 23    | 34   |
| 3381                      | GD7-30/M103 1023     | 6     | 33.1   | 51.8  | 44     | 77.6    | 2.5    | 1       | 11.4    | 4.97  | 47.1    | 75      | 66.7   | 562     | 24    | 29   |
| 3382                      | ROBUST               | 6     | 32.4   | 64.1  | 45     | 77.7    | 2.0    | 1       | 12.1    | 5.13  | 44.4    | 120     | 52.3   | 420     | 36    | 3    |
| 3383                      | BT459                | 6     | 31.1   | 72.6  | 51     | 79.8    | 2.3    | 1       | 10.3    | 4.96  | 52.5    | 89      | 74.7   | 223     | 31    | 11   |
| 3384                      | LACEY                | 6     | 34.6   | 74.6  | 47     | 79.1    | 2.1    | 1       | 11.3    | 4.98  | 47.4    | 113     | 59.2   | 258     | 41    | 1    |
| 3385                      | GD7-30/M103 1029     | 6     | 31.4   | 59.0  | 47     | 78.4    | 2.4    | 1       | 11.4    | 5.10  | 46.6    | 84      | 70.2   | 440     | 27    | 26   |
| 3386                      | GD7-30/M103 1031     | 6     | 33.3   | 57.4  | 46     | 77.8    | 2.3    | 1       | 11.3    | 5.24  | 46.3    | 84      | 67.2   | 493     | 24    | 29   |
| 3387                      | GD7-30/M103 1033     | 6     | 32.2   | 59.7  | 52     | 78.0    | 2.4    | 1       | 11.7    | 5.27  | 48.3    | 85      | 71.2   | 277     | 31    | 11   |
| 3388                      | GD7-30/M103 1035     | 6     | 33.1   | 64.1  | 50     | 77.4    | 2.5    | 1       | 12.5    | 5.56  | 46.9    | 107     | 67.5   | 394     | 20    | 42   |
| 3389                      | GD7-30/M103 1037     | 6     | 34.0   | 66.8  | 44     | 78.8    | 2.3    | 1       | 11.4    | 4.84  | 45.4    | 74      | 66.6   | 387     | 33    | 5    |
| 3390                      | GD7-30/M103 1041     | 6     | 33.8   | 61.5  | 44     | 77.2    | 2.5    | 1       | 12.5    | 5.19  | 43.4    | 87      | 66.2   | 398     | 24    | 29   |
| 3359                      | MOREX MALT CHECK     | 6     | 30.9   | 71.6  | 68     | 79.3    | 1.8    | 1       | 12.4    | 5.60  | 47.8    | 135     | 73.2   | 157     | 36    |      |
| 3380                      | MOREX MALT CHECK     | 6     | 31.4   | 71.3  | 70     | 79.9    | 1.7    | 1       | 12.5    | 5.71  | 48.1    | 125     | 73.5   | 178     | 32    |      |
| Minima                    |                      |       | 29.4   | 41.2  | 42     | 76.5    | 2.0    |         | 10.3    | 4.53  | 42.1    | 74      | 52.3   | 88      | 15    |      |
| Maxima                    |                      |       | 34.6   | 74.6  | 53     | 80.5    | 2.9    |         | 13.6    | 5.89  | 52.5    | 134     | 87.7   | 562     | 41    |      |
| Means                     |                      |       | 32.1   | 58.2  | 47     | 78.3    | 2.4    |         | 11.6    | 5.13  | 46.7    | 102     | 72.3   | 365     | 28    |      |
| Standard Deviations       |                      |       | 1.3    | 8.5   | 3      | 0.9     | 0.2    |         | 0.7     | 0.28  | 2.1     | 16      | 7.9    | 110     | 6     |      |
| Coefficients of Variation |                      |       | 4.0    | 14.7  | 6      | 1.2     | 7.9    |         | 6.1     | 5.41  | 4.5     | 16      | 10.9   | 30      | 20    |      |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by K. Smith, University of Minnesota - St. Paul

## 2000 EARLY GENERATION LINES (GROUP 16) - CROOKSTON, MN

Table 26

| Lab No.                   | Variety or Selection | Rowed | Kernel          | on   | Barley            | Malt           | Barley        | Wort            | Alpha-         | Beta-          | Overall |                  |        |         |       |      |
|---------------------------|----------------------|-------|-----------------|------|-------------------|----------------|---------------|-----------------|----------------|----------------|---------|------------------|--------|---------|-------|------|
|                           |                      |       | Weight<br>6/64" | (%)  | Color<br>(Agtron) | Extract<br>(%) | Wort<br>Color | Wort<br>Clarity | Protein<br>(%) | Protein<br>(%) |         | amylase<br>(ppm) | glucan | Quality | Score | Rank |
| 3391                      | GD7-30/M103 1043     | 6     | 32.7            | 59.7 | 44                | 77.1           | 2.4           | 1               | 12.8           | 5.34           | 44.9    | 90               | 71.3   | 359     | 20    | 15   |
| 3392                      | GD7-30/M103 1045     | 6     | 34.1            | 61.3 | 48                | 77.4           | 2.3           | 1               | 11.6           | 5.03           | 47.0    | 91               | 68.9   | 340     | 24    | 11   |
| 3393                      | GD7-30/M103 1047     | 6     | 32.1            | 51.1 | 43                | 77.9           | 2.4           | 1               | 11.6           | 5.14           | 46.5    | 83               | 65.0   | 355     | 24    | 11   |
| 3394                      | GD7-30/M103 1049     | 6     | 32.7            | 48.3 | 45                | 78.3           | 2.3           | 1               | 12.5           | 5.71           | 48.8    | 109              | 73.8   | 379     | 19    | 16   |
| 3395                      | BT459                | 6     | 32.6            | 77.1 | 51                | 78.9           | 2.4           | 1               | 11.7           | 5.54           | 48.8    | 103              | 83.2   | 206     | 35    | 4    |
| 3396                      | GD7-30/M103 1053     | 6     | 34.3            | 50.8 | 51                | 77.5           | 2.6           | 1               | 10.8           | 4.84           | 47.9    | 75               | 64.5   | 318     | 24    | 11   |
| 3397                      | GD7-30               | 6     | 32.3            | 55.6 | 48                | 79.2           | 2.4           | 1               | 11.2           | 5.06           | 48.9    | 80               | 63.3   | 348     | 31    | 6    |
| 3398                      | GD7-30/M103 1055     | 6     | 32.8            | 57.4 | 46                | 78.1           | 2.6           | 1               | 10.7           | 5.03           | 50.3    | 74               | 66.3   | 290     | 31    | 6    |
| 3399                      | BT459/M105 1061      | 6     | 32.1            | 71.9 | 50                | 78.1           | 2.1           | 1               | 11.7           | 5.02           | 46.3    | 110              | 67.2   | 348     | 31    | 6    |
| 3400                      | BT459/M105 1063      | 6     | 33.0            | 86.5 | 45                | 78.6           | 2.3           | 1               | 11.1           | 4.92           | 46.4    | 89               | 77.0   | 290     | 36    | 2    |
| 3401                      | BT459/M105 1075      | 6     | 35.0            | 97.1 | 50                | 78.8           | 2.3           | 1               | 11.3           | 4.93           | 47.6    | 92               | 74.2   | 327     | 33    | 5    |
| 3402                      | BT459/M105 1079      | 6     | 31.6            | 74.2 | 48                | 77.7           | 2.5           | 1               | 10.9           | 5.04           | 50.4    | 77               | 71.2   | 305     | 26    | 10   |
| 3403                      | BT459/M105 1085      | 6     | 32.2            | 82.1 | 44                | 78.9           | 2.2           | 1               | 10.4           | 4.86           | 49.7    | 89               | 71.0   | 284     | 31    | 6    |
| 3404                      | BT459/M105 1087      | 6     | 34.0            | 67.2 | 49                | 77.7           | 2.3           | 1               | 10.0           | 4.72           | 50.8    | 82               | 72.8   | 238     | 22    | 14   |
| 3405                      | BT459/M105 1091      | 6     | 33.6            | 82.1 | 45                | 78.8           | 2.2           | 1               | 11.7           | 5.04           | 44.6    | 115              | 70.6   | 244     | 41    | 1    |
| 3406                      | BT459/M105 1095      | 6     | 33.4            | 78.2 | 41                | 78.6           | 2.3           | 1               | 11.9           | 5.30           | 46.8    | 109              | 77.1   | 237     | 36    | 2    |
| 3407                      | MOREX MALT CHECK     | 6     | 31.7            | 72.8 | 71                | 79.8           | 1.9           | 1               | 12.6           | 5.69           | 48.6    | 129              | 70.5   | 114     | 31    |      |
| Minima                    |                      |       | 31.6            | 48.3 | 41                | 77.1           | 2.1           |                 | 10.0           | 4.72           | 44.6    | 74               | 63.3   | 206     | 19    |      |
| Maxima                    |                      |       | 35.0            | 97.1 | 51                | 79.2           | 2.6           |                 | 12.8           | 5.71           | 50.8    | 115              | 83.2   | 379     | 41    |      |
| Means                     |                      |       | 33.0            | 68.8 | 47                | 78.2           | 2.3           |                 | 11.4           | 5.09           | 47.8    | 92               | 71.1   | 304     | 29    |      |
| Standard Deviations       |                      |       | 1.0             | 14.5 | 3                 | 0.6            | 0.1           |                 | 0.7            | 0.26           | 1.9     | 13               | 5.3    | 52      | 6     |      |
| Coefficients of Variation |                      |       | 2.9             | 21.1 | 7                 | 0.8            | 6.1           |                 | 6.5            | 5.11           | 4.0     | 15               | 7.5    | 17      | 22    |      |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by K. Smith, University of Minnesota - St. Paul

## 2000 EARLY GENERATION LINES (GROUP 17) - ST. PAUL, MN

Table 27

| Lab No. | Variety or Selection | Rowed    | Kernel | on    | Barley  | Malt    | Barley | Wort    | S/T     | Alpha-  | Beta-   | Overall |       |      |    |    |
|---------|----------------------|----------|--------|-------|---------|---------|--------|---------|---------|---------|---------|---------|-------|------|----|----|
|         |                      |          | Weight | 6/64" | Color   | Extract | Wort   | Protein | Protein | DP      | amylase | glucan  |       |      |    |    |
| (mg)    | (%)                  | (Agtron) | (%)    | Color | Clarity | (%)     | (%)    | (%)     | (%)     | (°ASBC) | (20°DU) | (ppm)   | Score | Rank |    |    |
| 3408    | M96-03/M105 1131     | 6        | 34.4   | 63.8  | 36      | 79.6    | 3.1    | 1       | 11.5    | 5.75    | 52.1    | 75      | 78.4  | 137  | 34 | 2  |
| 3409    | M96-03/M105 1132     | 6        | 34.8   | 73.2  | 35      | 80.4    | 2.9    | 1       | 11.7    | 5.76    | 52.6    | 73      | 77.0  | 134  | 40 | 1  |
| 3410    | M96-03/M105 1133     | 6        | 30.1   | 44.2  | 48      | 79.2    | 2.8    | 1       | 13.5    | 6.42    | 50.5    | 133     | 84.9  | 168  | 25 | 8  |
| 3411    | M96-03/M105 1134     | 6        | 34.3   | 70.6  | 48      | 79.2    | 2.6    | 1       | 13.8    | 6.62    | 49.9    | 135     | 77.6  | 255  | 29 | 4  |
| 3412    | M96-03/M105 1135     | 6        | 31.1   | 40.1  | 49      | 79.0    | 2.6    | 1       | 14.3    | 6.76    | 49.7    | 167     | 81.7  | 174  | 20 | 17 |
| 3413    | M96-03/M105 1136     | 6        | 29.8   | 42.6  | 48      | 76.9    | 2.6    | 1       | 13.7    | 6.11    | 46.3    | 118     | 77.6  | 170  | 12 | 24 |
| 3414    | M96-03/M105 1137     | 6        | 30.8   | 50.9  | 44      | 79.1    | 2.8    | 1       | 13.3    | 6.12    | 48.2    | 129     | 79.7  | 272  | 21 | 13 |
| 3415    | M96-03/M105 1138     | 6        | 33.0   | 64.1  | 53      | 79.0    | 2.3    | 1       | 13.8    | 6.32    | 49.3    | 128     | 77.1  | 255  | 22 | 11 |
| 3416    | M96-03/M105 1139     | 6        | 29.7   | 44.7  | 43      | 78.4    | 2.8    | 1       | 12.8    | 6.28    | 52.3    | 118     | 84.0  | 192  | 16 | 20 |
| 3417    | M96-03/M105 1140     | 6        | 29.7   | 42.9  | 42      | 78.9    | 3.3    | 1       | 11.7    | 5.88    | 54.0    | 82      | 82.4  | 198  | 24 | 10 |
| 3418    | M96-03/M105 1141     | 6        | 32.4   | 62.2  | 53      | 78.7    | 2.5    | 1       | 13.1    | 6.23    | 49.8    | 122     | 75.3  | 216  | 19 | 19 |
| 3419    | M96-03/M105 1142     | 6        | 31.0   | 56.5  | 40      | 79.4    | 2.8    | 1       | 11.1    | 5.58    | 53.4    | 73      | 77.4  | 278  | 29 | 4  |
| 3420    | M96-03/M105 1143     | 6        | 31.9   | 63.7  | 49      | 78.5    | 2.7    | 1       | 12.0    | 6.15    | 51.4    | 104     | 75.6  | 339  | 20 | 17 |
| 3421    | M96-03/M105 1144     | 6        | 31.3   | 60.6  | 48      | 78.9    | 2.3    | 1       | 13.7    | 6.43    | 47.2    | 141     | 81.3  | 265  | 25 | 8  |
| 3422    | M96-03/M105 1145     | 6        | 32.6   | 64.7  | 49      | 78.3    | 2.2    | 1       | 13.6    | 6.02    | 44.6    | 109     | 75.5  | 386  | 21 | 13 |
| 3423    | M96-03/M105 1146     | 6        | 31.1   | 51.8  | 51      | 77.5    | 2.5    | 1       | 14.3    | 6.74    | 47.8    | 149     | 83.2  | 249  | 16 | 20 |
| 3424    | M96-03/M105 1147     | 6        | 32.3   | 59.9  | 49      | 77.7    | 2.5    | 1       | 13.6    | 6.37    | 46.9    | 149     | 81.5  | 218  | 22 | 11 |
| 3425    | M96-03/M105 1148     | 6        | 29.7   | 70.7  | 54      | 79.0    | 2.5    | 1       | 12.4    | 5.90    | 49.0    | 102     | 78.9  | 328  | 27 | 7  |
| 3426    | M96-03/M105 1149     | 6        | 33.6   | 83.8  | 45      | 80.0    | 2.5    | 1       | 11.6    | 5.74    | 50.5    | 99      | 75.7  | 359  | 32 | 3  |
| 3427    | M96-03/M105 1150     | 6        | 31.6   | 64.5  | 54      | 78.4    | 2.2    | 1       | 13.3    | 6.14    | 48.4    | 120     | 74.1  | 309  | 15 | 22 |
| 3429    | M96-03/M105 1151     | 6        | 32.6   | 64.3  | 51      | 77.4    | 2.2    | 1       | 14.0    | 6.38    | 48.4    | 145     | 75.4  | 382  | 14 | 23 |
| 3430    | M96-03/M105 1152     | 6        | 31.6   | 54.9  | 40      | 79.4    | 2.8    | 1       | 11.4    | 5.74    | 50.8    | 87      | 82.0  | 224  | 29 | 4  |
| 3431    | ROBUST MCIA          | 6        | 32.6   | 68.7  | 33      | 76.6    | 2.2    | 1       | *17.1   | 7.05    | 42.1    | *226    | 70.5  | 368  | 12 | 24 |
| 3432    | M96-03/M105 1154     | 6        | 31.6   | 51.5  | 51      | 77.6    | 2.4    | 1       | 14.4    | 6.51    | 48.6    | 171     | 77.3  | 234  | 9  | 27 |
| 3433    | M96-03/M105 1155     | 6        | 29.4   | 38.6  | 42      | 78.3    | 2.8    | 1       | 12.2    | 6.01    | 53.8    | 94      | 81.7  | 198  | 21 | 13 |
| 3434    | M96-03/M105 1156     | 6        | 31.2   | 44.1  | 37      | 78.2    | 3.0    | 1       | 12.5    | 5.94    | 49.3    | 92      | 81.6  | 205  | 21 | 13 |
| 3435    | M96-03/M105 1157     | 6        | 29.4   | 38.9  | 46      | 77.7    | 2.6    | 1       | 12.9    | 6.06    | 47.8    | 103     | 72.0  | 193  | 12 | 24 |

Table 27

| Lab No.                   | Variety          | Rowed | Kernel | on    | Barley   | Malt    | Barley | Wort    | Alpha-  | Beta-   |      |         |         |        |         |
|---------------------------|------------------|-------|--------|-------|----------|---------|--------|---------|---------|---------|------|---------|---------|--------|---------|
|                           |                  |       | Weight | 6/64" | Color    | Extract | Wort   | Wort    | Protein | Protein | S/T  | DP      | amylase | glucan | Quality |
|                           |                  |       | (mg)   | (%)   | (Agtron) | (%)     | Color  | Clarity | (%)     | (%)     | (%)  | (°ASBC) | (20°DU) | (ppm)  | Score   |
| 3428                      | MOREX MALT CHECK | 6     | 31.7   | 72.2  | 72       | 79.6    | 1.6    | 1       | 12.1    | 5.66    | 48.6 | 151     | 73.4    | 122    | 43      |
| Minima                    |                  |       | 29.4   | 38.6  | 33       | 76.6    | 2.2    |         | 11.1    | 5.58    | 42.1 | 73      | 70.5    | 134    | 9       |
| Maxima                    |                  |       | 34.8   | 83.8  | 54       | 80.4    | 3.3    |         | 14.4    | 7.05    | 54.0 | 171     | 84.9    | 386    | 40      |
| Means                     |                  |       | 31.6   | 56.9  | 46       | 78.6    | 2.6    |         | 12.9    | 6.19    | 49.4 | 116     | 78.5    | 248    | 22      |
| Standard Deviations       |                  |       | 1.6    | 12.1  | 6        | 0.9     | 0.3    |         | 1.0     | 0.36    | 2.8  | 28      | 3.7     | 74     | 7       |
| Coefficients of Variation |                  |       | 4.9    | 21.2  | 13       | 1.2     | 11.3   |         | 7.9     | 5.80    | 5.6  | 24      | 4.7     | 30     | 34      |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by K. Smith, University of Minnesota - St. Paul

## 2000 EARLY GENERATION LINES (GROUP 18) - ST. PAUL, MN

Table 28

| Lab No. | Variety or Selection | Rowed | Kernel | on    | Barley   | Malt    | Barley | Wort    | Alpha-  | Beta-   | Quality | Overall |       |       |      |    |
|---------|----------------------|-------|--------|-------|----------|---------|--------|---------|---------|---------|---------|---------|-------|-------|------|----|
|         |                      |       | Weight | 6/64" | Color    | Extract | Wort   | Wort    | Protein | Protein |         |         |       |       |      |    |
|         |                      |       | (mg)   | (%)   | (Agtron) | (%)     | Color  | Clarity | (%)     | (%)     | (°ASBC) | (20°DU) | (ppm) | Score | Rank |    |
| 3436    | M96-03/M105 1158     | 6     | 33.3   | 71.3  | 49       | 77.7    | 2.2    | 1       | 14.2    | 6.21    | 44.5    | 134     | 67.8  | 270   | 22   | 13 |
| 3437    | M96-03/M105 1159     | 6     | 32.4   | 60.3  | 52       | 78.3    | 2.4    | 1       | 12.9    | 6.06    | 47.6    | 114     | 70.6  | 233   | 19   | 20 |
| 3438    | M96-03/M105 1160     | 6     | 29.3   | 34.7  | 37       | 78.3    | 2.9    | 1       | 12.2    | 6.03    | 52.6    | 82      | 75.1  | 271   | 21   | 18 |
| 3439    | M96-03/105 1161      | 6     | 31.5   | 59.4  | 48       | 78.2    | 2.4    | 1       | 13.9    | 6.36    | 48.2    | 151     | 74.4  | 274   | 25   | 7  |
| 3440    | M96-03/M105 1162     | 6     | 31.6   | 73.8  | 57       | 78.8    | 2.3    | 1       | 13.7    | 6.48    | 48.3    | 142     | 70.4  | 314   | 25   | 7  |
| 3441    | M96-03/M105 1163     | 6     | 30.5   | 38.2  | 39       | 77.9    | 3.1    | 1       | 12.4    | 5.95    | 50.6    | 83      | 72.9  | 196   | 22   | 13 |
| 3442    | M96-03/M105 1164     | 6     | 31.0   | 53.3  | 51       | 78.5    | 2.7    | 1       | 11.5    | 5.64    | 50.3    | 70      | 70.6  | 315   | 23   | 11 |
| 3443    | M96-03/M105 1165     | 6     | 31.2   | 55.5  | 49       | 77.5    | 2.4    | 1       | 13.8    | 6.49    | 47.3    | 140     | 71.1  | 237   | 21   | 18 |
| 3444    | M96-03/M105 1166     | 6     | 31.0   | 47.6  | 43       | 78.4    | 2.9    | 1       | 11.6    | 5.68    | 50.3    | 77      | 75.7  | 192   | 26   | 5  |
| 3445    | M96-03/105 1167      | 6     | 35.0   | 70.9  | 48       | 78.7    | 2.4    | 1       | 12.9    | 5.94    | 49.5    | 93      | 65.3  | 413   | 22   | 13 |
| 3446    | M96-03/M105 1170     | 6     | 32.9   | 65.0  | 46       | 79.4    | 2.6    | 1       | 11.7    | 5.68    | 50.1    | 82      | 69.0  | 346   | 27   | 4  |
| 3447    | M96-03/M105 1171     | 6     | 33.0   | 69.3  | 46       | 79.0    | 2.9    | 1       | 12.8    | 6.10    | 49.3    | 92      | 70.7  | 334   | 19   | 20 |
| 3448    | M96-03/M105 1172     | 6     | 30.8   | 52.8  | 53       | 77.8    | 2.3    | 1       | 13.9    | 6.49    | 47.2    | 129     | 72.3  | 315   | 11   | 27 |
| 3449    | M96-03/M105 1173     | 6     | 29.9   | 43.4  | 49       | 77.6    | 2.5    | 1       | 13.5    | 6.38    | 49.3    | 150     | 71.5  | 258   | 19   | 20 |
| 3450    | M96-03/M105 1174     | 6     | 30.5   | 44.7  | 48       | 77.8    | 2.5    | 1       | 12.5    | 5.82    | 48.5    | 88      | 70.1  | 201   | 17   | 25 |
| 3451    | M96-03/M105 1175     | 6     | 28.2   | 38.0  | 56       | 77.5    | 2.4    | 1       | 13.3    | 6.47    | 50.6    | 147     | 77.8  | 219   | 19   | 20 |
| 3452    | M96-03/M105 1176     | 6     | 33.4   | 69.8  | 49       | 78.5    | 2.5    | 1       | 12.6    | 6.00    | 51.1    | 109     | 66.7  | 299   | 22   | 13 |
| 3454    | M96-03/105 1177      | 6     | 30.2   | 37.4  | 48       | 78.1    | 2.4    | 1       | 13.7    | 6.35    | 48.3    | 158     | 74.2  | 249   | 25   | 7  |
| 3455    | M96-03/M105 1178     | 6     | 33.4   | 66.4  | 45       | 79.2    | 3.0    | 2       | 11.4    | 5.62    | 49.6    | 75      | 67.4  | 304   | 26   | 5  |
| 3456    | M96-03/M105 1179     | 6     | 32.0   | 56.8  | 44       | 78.1    | 2.9    | 1       | 12.4    | 5.94    | 51.8    | 77      | 69.9  | 312   | 24   | 10 |
| 3457    | M96-03/M105 1180     | 6     | 34.2   | 66.0  | 41       | 79.5    | 2.7    | 1       | 12.0    | 5.74    | 50.5    | 86      | 68.1  | 288   | 30   | 2  |
| 3458    | M96-03/M105 1181     | 6     | 32.9   | 58.9  | 48       | 78.3    | 2.5    | 1       | 12.9    | 5.97    | 49.0    | 96      | 67.9  | 272   | 22   | 13 |
| 3459    | M96-03/M105 1182     | 6     | 33.8   | 71.7  | 52       | 78.3    | 2.2    | 1       | 13.5    | 6.17    | 46.9    | 131     | 66.5  | 330   | 23   | 11 |
| 3460    | M96-03/M105 1183     | 6     | 29.2   | 39.0  | 48       | 77.3    | 2.6    | 1       | 13.3    | 6.45    | 49.4    | 133     | 75.6  | 241   | 16   | 26 |
| 3461    | M96-03/M105 1184     | 6     | 33.2   | 70.8  | 54       | 78.4    | 2.2    | 1       | 13.5    | 6.16    | 48.9    | 119     | 69.7  | 308   | 19   | 20 |
| 3462    | M96-03/M105 1186     | 6     | 32.1   | 61.9  | 57       | 79.2    | 2.2    | 1       | 12.2    | 5.90    | 50.8    | 138     | 71.4  | 243   | 34   | 1  |
| 3463    | M86-03/M105 1187     | 6     | 28.7   | 39.3  | 56       | 78.4    | 2.6    | 1       | 12.1    | 5.96    | 51.5    | 131     | 75.6  | 157   | 28   | 3  |

Table 28

| Lab No.                   | Variety or Selection | Rowed | Kernel | on    | Barley | Malt    | Barley | Wort | Alpha-  |         | Beta- | Overall |         |        |         |
|---------------------------|----------------------|-------|--------|-------|--------|---------|--------|------|---------|---------|-------|---------|---------|--------|---------|
|                           |                      |       | Weight | 6/64" | Color  | Extract | Wort   | Wort | Protein | Protein | S/T   | DP      | amylase | glucan | Quality |
| 3453                      | MOREX MALT CHECK     | 6     | 31.3   | 71.4  | 72     | 79.4    | 1.8    | 1    | 12.8    | 5.74    | 48.6  | 132     | 67.8    | 140    | 35      |
| Minima                    |                      |       | 28.2   | 34.7  | 37     | 77.3    | 2.2    |      | 11.4    | 5.62    | 44.5  | 70      | 65.3    | 157    | 11      |
| Maxima                    |                      |       | 35.0   | 73.8  | 57     | 79.5    | 3.1    |      | 14.2    | 6.49    | 52.6  | 158     | 77.8    | 413    | 34      |
| Means                     |                      |       | 31.7   | 56.2  | 49     | 78.3    | 2.5    |      | 12.8    | 6.08    | 49.3  | 112     | 71.0    | 274    | 22      |
| Standard Deviations       |                      |       | 1.8    | 12.9  | 5      | 0.6     | 0.3    |      | 0.8     | 0.28    | 1.7   | 29      | 3.3     | 56     | 5       |
| Coefficients of Variation |                      |       | 5.6    | 23.0  | 11     | 0.8     | 10.4   |      | 6.4     | 4.67    | 3.5   | 25      | 4.6     | 20     | 21      |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by K. Smith, University of Minnesota - St. Paul

## 2000 EXPERIMENT 21A, PRELIMINARY YIELD TRIAL - FARGO, ND

Table 29

| Lab No.                   | Variety or Selection | Rowed | Kernel Weight (mg) | on 6/64" | Barley Color (Agron) | Malt Extract (%) | Wort Color | Wort Clarity | Barley Protein (%) | Wort Protein (%) | S/T (%) | DP (°ASBC) | Alpha-amylase (20°DU) | Beta-glucan (ppm) | Quality Score | Overall Rank |
|---------------------------|----------------------|-------|--------------------|----------|----------------------|------------------|------------|--------------|--------------------|------------------|---------|------------|-----------------------|-------------------|---------------|--------------|
| 489                       | MOREX                | 6     | 28.0               | 42.2     | 47                   | 75.4             | 1.8        | 1            | 13.8               | 5.84             | 42.1    | 169        | 66.5                  | 85                | 26            | 15           |
| 490                       | ROBUST               | 6     | 30.8               | 55.8     | 49                   | 76.8             | 1.7        | 1            | 13.3               | 5.72             | 45.2    | 169        | 56.6                  | 161               | 30            | 7            |
| 491                       | STANDER              | 6     | 30.4               | 66.3     | 48                   | 78.2             | 2.4        | 1            | 12.6               | 6.44             | 51.8    | 157        | 81.2                  | 151               | 25            | 16           |
| 492                       | FOSTER               | 6     | 31.3               | 69.9     | 44                   | 77.1             | 2.0        | 1            | 11.8               | 5.44             | 46.8    | 159        | 60.9                  | 203               | 29            | 10           |
| 493                       | DRUMMOND             | 6     | 29.9               | 56.8     | 53                   | 77.4             | 1.7        | 1            | 12.9               | 5.29             | 42.2    | 188        | 60.7                  | 104               | 28            | 12           |
| 494                       | ND18435              | 6     | 30.9               | 64.9     | 46                   | 76.7             | 2.1        | 1            | 13.2               | 5.72             | 44.9    | 171        | 66.7                  | 60                | 22            | 22           |
| 495                       | ND18436              | 6     | 32.3               | 65.1     | 48                   | 76.7             | 2.0        | 1            | 13.7               | 5.73             | 43.9    | 175        | 63.6                  | 50                | 23            | 19           |
| 496                       | ND18437              | 6     | 30.1               | 52.2     | 51                   | 75.1             | 2.0        | 1            | 13.4               | 5.58             | 43.3    | 163        | 65.4                  | 104               | 30            | 7            |
| 497                       | ND18440              | 6     | 33.7               | 79.9     | 44                   | 76.8             | 2.4        | 1            | 14.1               | 6.52             | 47.3    | 216        | 69.8                  | 74                | 15            | 24           |
| 498                       | ND18441              | 6     | 33.8               | 79.4     | 47                   | 77.5             | 2.0        | 1            | 13.7               | 6.01             | 44.9    | 166        | 73.6                  | 141               | 33            | 4            |
| 499                       | ND18442              | 6     | 32.5               | 74.3     | 50                   | 77.5             | 1.9        | 1            | 12.8               | 5.61             | 46.1    | 167        | 68.8                  | 69                | 25            | 16           |
| 500                       | ND18444              | 6     | 32.4               | 71.1     | 48                   | 76.9             | 2.3        | 1            | 13.7               | 6.30             | 46.4    | 226        | 70.9                  | 48                | 18            | 23           |
| 501                       | ND18450              | 6     | 32.5               | 76.2     | 49                   | 77.0             | 1.8        | 2            | 13.2               | 5.13             | 41.2    | 136        | 57.3                  | 189               | 37            | 2            |
| 502                       | ND18451              | 6     | 33.3               | 77.4     | 49                   | 77.9             | 2.5        | 1            | 13.2               | 6.79             | 53.8    | 174        | 80.6                  | 122               | 24            | 18           |
| 503                       | ND18452              | 6     | 32.8               | 73.7     | 54                   | 77.7             | 2.4        | 1            | 13.4               | 6.61             | 51.3    | 154        | 77.1                  | 123               | 29            | 10           |
| 504                       | ND18460              | 6     | 34.9               | 80.0     | 44                   | 77.7             | 2.2        | 1            | 13.3               | 5.66             | 44.4    | 209        | 67.2                  | 116               | 32            | 5            |
| 505                       | ND18463              | 6     | 30.7               | 58.5     | 50                   | 77.2             | 2.1        | 1            | 13.4               | 5.92             | 45.2    | 161        | 72.2                  | 109               | 30            | 7            |
| 506                       | ND18465              | 6     | 34.9               | 79.7     | 50                   | 76.8             | 2.1        | 1            | 12.9               | 5.39             | 44.1    | 156        | 64.5                  | 105               | 39            | 1            |
| 508                       | ND18472              | 6     | 31.4               | 61.5     | 47                   | 77.8             | 2.0        | 1            | 13.0               | 6.39             | 52.2    | 193        | 69.5                  | 55                | 14            | 25           |
| 509                       | ND18478              | 6     | 31.3               | 63.7     | 54                   | 78.4             | 2.5        | 1            | 12.0               | 6.42             | 54.8    | 119        | 82.5                  | 133               | 27            | 13           |
| 510                       | ND18479              | 6     | 32.2               | 64.1     | 48                   | 78.0             | 2.3        | 1            | 13.3               | 6.59             | 51.3    | 139        | 80.3                  | 185               | 23            | 19           |
| 511                       | ND18482              | 6     | 32.7               | 67.5     | 49                   | 77.1             | 2.2        | 1            | 13.2               | 6.21             | 49.5    | 136        | 74.1                  | 133               | 23            | 19           |
| 512                       | ND18484              | 6     | 31.0               | 60.1     | 48                   | 77.1             | 2.2        | 2            | 13.1               | 5.90             | 46.5    | 145        | 74.9                  | 108               | 27            | 13           |
| 513                       | ND18497              | 6     | 32.7               | 73.9     | 49                   | 76.8             | 2.1        | 2            | 12.7               | 5.78             | 48.4    | 147        | 63.3                  | 101               | 31            | 6            |
| 514                       | ND18507              | 6     | 34.3               | 77.7     | 45                   | 75.9             | 1.8        | 1            | 13.8               | 5.63             | 43.2    | 156        | 65.2                  | 155               | 35            | 3            |
| 507                       | MOREX MALT CHECK     | 6     | 31.7               | 71.1     | 71                   | 79.0             | 1.6        | 1            | 12.1               | 5.62             | 45.8    | 144        | 60.8                  | 66                | 44            |              |
| Minima                    |                      |       | 28.0               | 42.2     | 44                   | 75.1             | 1.7        |              | 11.8               | 5.13             | 41.2    | 119        | 56.6                  | 48                | 14            |              |
| Maxima                    |                      |       | 34.9               | 80.0     | 54                   | 78.4             | 2.5        |              | 14.1               | 6.79             | 54.8    | 226        | 82.5                  | 203               | 39            |              |
| Means                     |                      |       | 32.0               | 67.7     | 48                   | 77.1             | 2.1        |              | 13.2               | 5.95             | 46.8    | 166        | 69.3                  | 115               | 27            |              |
| Standard Deviations       |                      |       | 1.7                | 9.9      | 3                    | 0.8              | 0.2        |              | 0.5                | 0.46             | 3.8     | 25         | 7.4                   | 43                | 6             |              |
| Coefficients of Variation |                      |       | 5.2                | 14.6     | 6                    | 1.0              | 11.6       |              | 4.0                | 7.70             | 8.2     | 15         | 10.6                  | 38                | 23            |              |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by R.D. Horsley and J.D. Franckowiak, North Dakota State University - Fargo

## 2000 EXPERIMENT 21B, PRELIMINARY YIELD TRIAL - FARGO, ND

Table 30

| Lab No. | Variety or Selection | Rowed | Kernel | on       | Barley | Malt    | Barley  | Wort    | Alpha- | Beta-   | Overall |       |       |      |    |    |
|---------|----------------------|-------|--------|----------|--------|---------|---------|---------|--------|---------|---------|-------|-------|------|----|----|
|         |                      |       | Weight | 6/64"    | Color  | Extract | Wort    | Protein | S/T    | DP      |         |       |       |      |    |    |
|         |                      | (mg)  | (%)    | (Agtron) | (%)    | Color   | Clarity | (%)     | (%)    | (°ASBC) | (20°DU) | (ppm) | Score | Rank |    |    |
| 515     | MOREX                | 6     | 28.4   | 56.7     | 47     | 76.6    | 2.0     | 1       | 13.2   | 5.89    | 45.4    | 162   | 68.7  | 108  | 28 | 12 |
| 516     | ROBUST               | 6     | 31.3   | 69.6     | 47     | 77.2    | 1.9     | 1       | 13.4   | 5.75    | 44.3    | 170   | 65.0  | 214  | 22 | 24 |
| 517     | STANDER              | 6     | 31.6   | 81.3     | 52     | 78.6    | 2.3     | 1       | 12.0   | 6.47    | 52.5    | 156   | 75.8  | 220  | 35 | 4  |
| 518     | FOSTER               | 6     | 31.1   | 72.5     | 43     | 77.1    | 1.9     | 1       | 11.6   | 5.36    | 47.3    | 150   | 60.8  | 236  | 32 | 7  |
| 519     | DRUMMOND             | 6     | 29.8   | 58.6     | 54     | 77.4    | 1.6     | 1       | 12.7   | 5.33    | 43.9    | 179   | 61.3  | 126  | 24 | 20 |
| 520     | ND18510              | 6     | 33.1   | 78.6     | 55     | 77.0    | 2.0     | 1       | 12.6   | 5.80    | 48.1    | 132   | 66.8  | 367  | 24 | 20 |
| 521     | ND18511              | 6     | 31.7   | 78.2     | 51     | 78.7    | 2.4     | 1       | 12.2   | 6.46    | 52.8    | 118   | 83.2  | 199  | 28 | 12 |
| 522     | ND18513              | 6     | 30.6   | 62.2     | 51     | 77.4    | 2.2     | 1       | 12.4   | 6.32    | 51.4    | 118   | 82.6  | 124  | 23 | 22 |
| 523     | ND18514              | 6     | 30.8   | 65.9     | 53     | 77.8    | 2.3     | 1       | 12.2   | 6.19    | 51.4    | 119   | 89.5  | 106  | 23 | 22 |
| 524     | ND18515              | 6     | 33.6   | 76.8     | 50     | 77.2    | 2.0     | 1       | 12.6   | 5.90    | 49.4    | 148   | 71.3  | 187  | 28 | 12 |
| 525     | ND18516              | 6     | 31.0   | 57.9     | 54     | 76.9    | 2.5     | 1       | 12.6   | 6.44    | 51.3    | 158   | 90.2  | 255  | 21 | 27 |
| 526     | ND18517              | 6     | 30.6   | 65.0     | 51     | 77.0    | 2.1     | 1       | 12.3   | 5.95    | 47.8    | 134   | 76.9  | 209  | 26 | 16 |
| 527     | ND18518              | 6     | 30.8   | 65.0     | 48     | 77.8    | 1.9     | 1       | 11.9   | 5.51    | 46.2    | 151   | 72.7  | 251  | 29 | 11 |
| 528     | ND18523              | 6     | 30.5   | 64.1     | 51     | 78.2    | 2.1     | 1       | 10.9   | 5.45    | 52.4    | 76    | 69.5  | 166  | 26 | 16 |
| 529     | ND18524              | 6     | 29.8   | 56.0     | 51     | 77.3    | 2.1     | 1       | 11.2   | 5.06    | 46.6    | 76    | 69.8  | 302  | 21 | 27 |
| 530     | ND18528              | 6     | 30.9   | 60.0     | 39     | 77.2    | 2.6     | 1       | 11.0   | 5.31    | 50.9    | 77    | 70.0  | 207  | 22 | 24 |
| 532     | ND18530              | 6     | 30.1   | 58.5     | 55     | 77.6    | 1.8     | 1       | 11.7   | 5.23    | 44.7    | 93    | 68.4  | 318  | 28 | 12 |
| 533     | ND18531              | 6     | 28.0   | 48.5     | 55     | 78.3    | 1.9     | 1       | 12.1   | 5.88    | 50.6    | 130   | 75.2  | 303  | 19 | 32 |
| 534     | ND18532              | 6     | 28.3   | 42.2     | 55     | 78.0    | 1.9     | 1       | 12.4   | 5.84    | 50.2    | 128   | 75.7  | 224  | 20 | 30 |
| 535     | ND18533              | 6     | 30.9   | 64.9     | 51     | 78.3    | 2.0     | 1       | 11.7   | 5.60    | 48.6    | 168   | 69.7  | 137  | 34 | 5  |
| 536     | ND18534              | 6     | 33.3   | 77.6     | 56     | 78.6    | 2.0     | 1       | 12.8   | 5.58    | 46.3    | 162   | 69.9  | 268  | 31 | 9  |
| 537     | ND18535              | 6     | 31.7   | 72.3     | 51     | 78.6    | 1.9     | 1       | 12.6   | 5.58    | 45.3    | 165   | 72.1  | 201  | 33 | 6  |
| 538     | ND18536              | 6     | 31.0   | 68.4     | 50     | 77.5    | 1.9     | 1       | 13.0   | 5.73    | 44.0    | 170   | 65.1  | 249  | 22 | 24 |
| 539     | ND18537              | 6     | 31.6   | 76.1     | 49     | 78.5    | 1.9     | 1       | 12.7   | 5.76    | 46.6    | 160   | 69.3  | 250  | 31 | 9  |
| 540     | ND18538              | 6     | 31.8   | 77.1     | 45     | 77.7    | n.d.    | 3       | 12.2   | 5.87    | 50.1    | 140   | 67.0  | 299  | 32 | 7  |
| 541     | ND18539              | 6     | 32.3   | 78.2     | 45     | 78.8    | 2.4     | 2       | 12.5   | 5.88    | 48.4    | 158   | 68.3  | 231  | 38 | 1  |
| 542     | ND18540              | 6     | 31.4   | 65.9     | 50     | 77.8    | n.d.    | 3       | 11.8   | 5.21    | 44.2    | 152   | 65.9  | 170  | 36 | 2  |
| 543     | ND18541              | 6     | 32.0   | 63.7     | 48     | 77.5    | n.d.    | 3       | 12.3   | 5.51    | 46.6    | 164   | 66.8  | 207  | 25 | 19 |
| 544     | ND18542              | 6     | 30.6   | 66.7     | 51     | 77.1    | 1.9     | 2       | 12.6   | 5.33    | 42.2    | 174   | 63.1  | 191  | 21 | 27 |
| 545     | ND18543              | 6     | 32.1   | 64.0     | 49     | 76.9    | 2.0     | 2       | 12.7   | 5.36    | 43.7    | 181   | 64.9  | 149  | 26 | 16 |

Table 30

| Lab No.                   | Variety or Selection | Rowed | Kernel | on       | Barley | Malt    |         | Barley | Wort    |         |      | Alpha-  | Beta-   | Overall |       |      |
|---------------------------|----------------------|-------|--------|----------|--------|---------|---------|--------|---------|---------|------|---------|---------|---------|-------|------|
|                           |                      |       | Weight | 6/64"    | Color  | Extract | Wort    | Wort   | Protein | Protein | S/T  | DP      | amylase | glucan  |       |      |
|                           |                      | (mg)  | (%)    | (Agtron) | (%)    | Color   | Clarity | (%)    | (%)     | (%)     | (%)  | (°ASBC) | (20°DU) | (ppm)   | Score | Rank |
| 546                       | ND18544              | 6     | 31.0   | 63.3     | 55     | 76.8    | n.d.    | 3      | 11.9    | 5.25    | 43.7 | 159     | 61.5    | 242     | 36    | 2    |
| 547                       | ND18545              | 6     | 31.2   | 59.8     | 52     | 76.6    | n.d.    | 3      | 12.9    | 5.74    | 43.8 | 182     | 63.8    | 224     | 20    | 30   |
| 531                       | MOREX MALT CHECK     | 6     | 30.4   | 68.0     | 72     | 79.5    | 1.6     | 1      | 12.3    | 5.81    | 49.6 | 142     | 66.9    | 126     | 40    |      |
| Minima                    |                      |       | 28.0   | 42.2     | 39     | 76.6    | 1.6     |        | 10.9    | 5.06    | 42.2 | 76      | 60.8    | 106     | 19    |      |
| Maxima                    |                      |       | 33.6   | 81.3     | 56     | 78.8    | 2.6     |        | 13.4    | 6.47    | 52.8 | 182     | 90.2    | 367     | 38    |      |
| Means                     |                      |       | 31.0   | 66.1     | 50     | 77.6    | 2.1     |        | 12.3    | 5.70    | 47.5 | 144     | 70.6    | 217     | 27    |      |
| Standard Deviations       |                      |       | 1.3    | 9.2      | 4      | 0.7     | 0.2     |        | 0.6     | 0.38    | 3.1  | 30      | 7.4     | 63      | 5     |      |
| Coefficients of Variation |                      |       | 4.1    | 13.9     | 8      | 0.8     | 11.4    |        | 4.8     | 6.69    | 6.6  | 21      | 10.5    | 29      | 20    |      |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by R.D. Horsley and J.D. Franckowiak, North Dakota State University - Fargo

## 2000 EXPERIMENT 22, PRELIMINARY YIELD TRIAL - FARGO, ND

Table 31

| Lab No. | Variety or Selection | Rowed | Kernel | on    | Barley | Malt    | Barley     | Wort         | Alpha-      | Beta-       | Overall |                 |              |       |      |    |
|---------|----------------------|-------|--------|-------|--------|---------|------------|--------------|-------------|-------------|---------|-----------------|--------------|-------|------|----|
|         |                      |       | Weight | 6/64" | Color  | Extract | Wort Color | Wort Clarity | Protein (%) | Protein (%) |         | amylase (20°DU) | glucan (ppm) | Score | Rank |    |
| 548     | MOREX                | 6     | 27.7   | *40.6 | 49     | 75.6    | 2.0        | 2            | 13.2        | 5.86        | 44.1    | 161             | 64.6         | 125   | 25   | 31 |
| 549     | ROBUST               | 6     | 30.0   | 53.4  | 48     | 77.1    | 1.9        | 2            | 13.1        | 5.98        | 47.1    | 158             | 57.2         | 234   | 27   | 25 |
| 550     | STANDER              | 6     | 31.4   | 65.1  | 43     | 78.8    | n.d.       | 3            | 12.5        | 6.58        | *55.1   | 147             | 75.8         | 204   | 23   | 41 |
| 551     | FOSTER               | 6     | 31.5   | 68.0  | 45     | 76.7    | n.d.       | 3            | 12.1        | 5.77        | 47.4    | 154             | 62.5         | 320   | 24   | 38 |
| 552     | DRUMMOND             | 6     | 30.6   | 61.5  | 53     | 78.3    | 1.7        | 2            | 12.4        | 5.61        | 45.7    | 168             | 64.9         | 155   | 34   | 9  |
| 553     | ND18546              | 6     | 31.6   | 72.7  | 50     | 78.0    | 2.1        | 2            | 12.8        | 5.96        | 48.6    | 149             | 66.2         | 217   | 30   | 13 |
| 554     | ND18549              | 6     | 31.4   | 67.7  | 52     | 77.7    | 2.1        | 2            | 12.5        | 5.64        | 46.5    | 150             | 68.9         | 175   | 28   | 23 |
| 556     | ND18550              | 6     | 31.8   | 67.0  | 50     | 77.0    | 2.0        | 2            | 12.6        | 5.26        | 43.6    | 140             | 63.3         | 254   | 29   | 17 |
| 557     | ND18551              | 6     | 30.7   | 63.6  | 56     | 77.0    | 1.9        | 2            | 12.5        | 5.14        | 42.2    | 143             | 64.2         | 207   | 37   | 3  |
| 558     | ND18552              | 6     | 31.5   | 65.9  | 46     | 77.8    | 2.0        | 2            | 12.2        | 5.34        | 44.1    | 149             | 64.8         | 190   | 33   | 11 |
| 559     | ND18554              | 6     | 30.8   | 63.6  | 50     | 77.1    | 1.9        | 2            | 13.3        | 5.35        | 41.3    | 164             | 64.0         | 171   | 25   | 31 |
| 560     | ND18556              | 6     | 30.2   | 67.0  | 49     | 77.6    | 2.0        | 2            | 12.7        | 5.82        | 47.5    | 154             | 67.0         | 134   | 27   | 25 |
| 561     | ND18562              | 6     | 32.0   | 73.5  | 48     | 79.1    | 2.2        | 2            | 12.1        | 5.63        | 46.6    | 142             | 70.8         | 238   | 38   | 2  |
| 562     | ND18565              | 6     | 32.8   | 72.6  | 54     | 78.7    | 1.9        | 2            | 12.6        | 5.40        | 44.1    | 148             | 68.8         | 203   | 36   | 5  |
| 563     | ND18566              | 6     | 30.7   | 67.3  | 53     | 78.0    | 1.8        | 2            | 12.3        | 5.12        | 44.0    | 139             | 63.9         | 224   | 34   | 9  |
| 564     | ND18567              | 6     | 31.1   | 68.7  | 47     | 77.6    | 1.9        | 1            | 12.1        | 5.51        | 47.2    | 146             | 64.5         | 208   | 29   | 17 |
| 565     | ND18568              | 6     | 32.3   | 66.6  | 54     | 78.3    | 2.1        | 1            | 12.3        | 5.81        | 50.1    | 166             | 71.4         | 130   | 35   | 8  |
| 566     | ND18572              | 6     | 30.9   | 66.1  | 49     | 77.8    | 2.1        | 1            | 12.6        | 5.85        | 49.1    | 160             | 71.0         | 148   | 25   | 31 |
| 567     | ND18573              | 6     | 31.7   | 71.9  | 50     | 78.6    | 2.0        | 1            | 11.8        | 5.79        | 50.4    | 136             | 69.3         | 127   | 37   | 3  |
| 568     | ND18576              | 6     | 30.0   | 57.3  | 44     | 78.3    | 2.1        | 1            | 12.4        | 6.15        | 50.7    | 180             | 74.2         | 124   | 27   | 25 |
| 569     | ND18577              | 6     | 28.4   | 44.8  | 44     | 76.9    | 2.1        | 1            | 13.3        | 6.04        | 47.4    | 203             | 74.9         | 111   | 16   | 43 |
| 570     | ND18578              | 6     | 32.2   | 73.3  | 52     | 77.6    | 2.1        | 1            | 12.8        | 5.95        | 48.3    | 166             | 62.3         | 248   | 25   | 31 |
| 571     | ND18579              | 6     | 30.3   | 69.3  | 50     | 77.7    | 2.1        | 1            | 12.3        | 5.93        | 49.2    | 157             | 64.2         | 250   | 29   | 17 |
| 572     | ND18581              | 6     | 32.8   | 67.3  | 45     | 77.9    | 2.0        | 1            | 12.0        | 5.59        | 47.2    | 162             | 69.0         | 168   | 27   | 25 |
| 573     | ND18588              | 6     | 30.1   | 59.6  | 48     | 76.7    | 1.8        | 1            | 12.9        | 5.64        | 45.6    | 149             | 66.3         | 197   | 29   | 17 |
| 574     | ND18601              | 6     | 32.0   | 69.3  | 46     | 76.2    | 2.0        | 1            | 13.0        | 5.75        | 45.9    | 167             | 68.3         | 132   | 30   | 13 |
| 575     | ND18602              | 6     | 30.3   | 65.0  | 50     | 76.1    | 1.9        | 1            | 13.2        | 5.91        | 46.8    | 141             | 69.1         | 198   | 24   | 38 |
| 576     | ND18603              | 6     | 30.9   | 64.7  | 46     | 77.8    | 2.1        | 1            | 13.0        | 6.00        | 46.2    | 129             | 69.5         | 196   | 17   | 42 |
| 577     | ND18611              | 6     | 31.9   | 72.8  | 49     | 77.1    | 1.9        | 1            | 13.1        | 5.76        | 46.2    | 145             | 65.5         | 165   | 27   | 25 |
| 578     | ND18614              | 6     | 29.2   | 54.6  | 48     | 76.9    | 2.0        | 1            | 13.3        | 6.09        | 46.9    | 131             | 64.6         | 190   | 16   | 43 |

Table 31

| Lab No.                   | Variety or Selection | Rowed | Kernel          | on   | Barley            | Malt           | Barley        | Wort            | Alpha-         | Beta-          | Overall |                  |        |               |      |    |
|---------------------------|----------------------|-------|-----------------|------|-------------------|----------------|---------------|-----------------|----------------|----------------|---------|------------------|--------|---------------|------|----|
|                           |                      |       | Weight<br>6/64" | (mg) | Color<br>(Agtron) | Extract<br>(%) | Wort<br>Color | Wort<br>Clarity | Protein<br>(%) | Protein<br>(%) |         | amylase<br>(ppm) | glucan | Quality Score | Rank |    |
| 579                       | ND18617              | 6     | 30.4            | 57.8 | 54                | 76.4           | 1.8           | 1               | 13.3           | 5.86           | 46.6    | 140              | 63.3   | 146           | 28   | 23 |
| 581                       | ND18624              | 6     | 32.9            | 72.6 | 43                | 77.0           | 2.2           | 1               | 12.6           | 6.14           | 48.9    | 142              | 73.1   | 170           | 25   | 31 |
| 582                       | ND18631              | 6     | 29.7            | 64.3 | 52                | 77.0           | 1.9           | 1               | 14.0           | 6.15           | 45.8    | 191              | 67.1   | 223           | 12   | 45 |
| 583                       | ND18633              | 6     | 29.7            | 59.8 | 46                | 77.0           | 2.0           | 1               | 12.5           | 5.68           | 45.2    | 124              | 64.4   | 162           | 25   | 31 |
| 584                       | ND18637              | 6     | 31.8            | 68.9 | 52                | 76.9           | 1.8           | 1               | 13.1           | 5.53           | 43.2    | 167              | 61.2   | 110           | 30   | 13 |
| 585                       | ND18639              | 6     | 32.5            | 78.3 | 47                | 77.7           | 2.2           | 1               | 12.1           | 5.99           | 51.4    | 156              | 65.1   | 135           | 39   | 1  |
| 586                       | ND18643              | 6     | 32.9            | 71.4 | 48                | 78.2           | 2.0           | 1               | 12.7           | 5.85           | 49.1    | *90              | 70.5   | 218           | 25   | 31 |
| 587                       | ND18644              | 6     | 32.2            | 69.7 | 47                | 78.1           | 1.9           | 1               | 12.4           | 5.56           | 45.8    | 99               | 69.0   | 199           | 32   | 12 |
| 588                       | ND18645              | 6     | 31.0            | 78.4 | 55                | 77.7           | 1.9           | 1               | 12.9           | 5.97           | 48.8    | 142              | 64.6   | 165           | 29   | 17 |
| 589                       | ND18646              | 6     | 29.9            | 70.9 | 50                | 77.6           | 2.0           | 1               | 12.5           | 5.99           | 49.8    | 141              | 65.4   | 201           | 30   | 13 |
| 590                       | ND18649              | 6     | 33.3            | 78.2 | 51                | 78.6           | 1.9           | 1               | 12.4           | 5.74           | 47.8    | 130              | 65.9   | 209           | 36   | 5  |
| 591                       | ND18650              | 6     | 31.5            | 71.3 | 52                | 78.1           | 1.9           | 1               | 12.3           | 5.67           | 47.4    | 140              | 65.5   | 234           | 36   | 5  |
| 592                       | ND18651              | 6     | 29.7            | 68.8 | 54                | 78.0           | 2.0           | 1               | 12.6           | 5.71           | 47.5    | 148              | 58.0   | 205           | 26   | 30 |
| 593                       | ND18659              | 6     | 32.3            | 76.0 | 50                | 78.5           | 2.0           | 1               | 12.7           | 6.10           | 48.3    | 145              | 66.5   | 212           | 29   | 17 |
| 594                       | ND18660              | 6     | 30.7            | 63.5 | 49                | 77.5           | 2.1           | 1               | 13.2           | 5.94           | 47.0    | 155              | 67.4   | 173           | 24   | 38 |
| 555                       | MOREX MALT CHECK     | 6     | 30.1            | 70.5 | 75                | 79.4           | 1.6           | 2               | 12.2           | 5.63           | 47.7    | 135              | 61.9   | 104           | 39   |    |
| 580                       | MOREX MALT CHECK     | 6     | 31.4            | 71.9 | 70                | 80.7           | 2.0           | 1               | 12.0           | 6.46           | 55.3    | 122              | 70.2   | 63            | 32   |    |
| Minima                    |                      |       | 27.7            | 44.8 | 43                | 75.6           | 1.7           |                 | 11.8           | 5.12           | 41.3    | 99               | 57.2   | 110           | 12   |    |
| Maxima                    |                      |       | 33.3            | 78.4 | 56                | 79.1           | 2.2           |                 | 14.0           | 6.58           | 51.4    | 203              | 75.8   | 320           | 39   |    |
| Means                     |                      |       | 31.1            | 67.0 | 49                | 77.6           | 2.0           |                 | 12.7           | 5.78           | 46.9    | 151              | 66.6   | 187           | 28   |    |
| Standard Deviations       |                      |       | 1.2             | 6.8  | 3                 | 0.8            | 0.1           |                 | 0.5            | 0.29           | 2.2     | 18               | 3.9    | 44            | 6    |    |
| Coefficients of Variation |                      |       | 3.9             | 10.1 | 7                 | 1.0            | 5.8           |                 | 3.6            | 4.98           | 4.8     | 12               | 5.9    | 24            | 21   |    |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by R.D. Horsley and J.D. Franckowiak, North Dakota State University - Fargo

## 2000 EXPERIMENT 23, PRELIMINARY YIELD TRIAL - FARGO, ND

Table 32

| Lab No.                   | Variety or Selection | Rowed | Kernel         | on    | Barley            | Malt           | Barley        | Wort            | Alpha-         | Beta-          | Quality | Overall |      |     |    |    |
|---------------------------|----------------------|-------|----------------|-------|-------------------|----------------|---------------|-----------------|----------------|----------------|---------|---------|------|-----|----|----|
|                           |                      |       | Weight<br>(mg) | 6/64" | Color<br>(Agrton) | Extract<br>(%) | Wort<br>Color | Wort<br>Clarity | Protein<br>(%) | Protein<br>(%) |         |         |      |     |    |    |
| 595                       | MOREX                | 6     | 28.4           | 66.0  | 45                | 76.5           | 2.3           | 1               | 12.8           | 6.11           | 49.8    | 139     | 71.5 | 101 | 20 | 20 |
| 596                       | ROBUST               | 6     | 29.7           | 81.0  | 45                | 78.5           | 2.6           | 1               | 12.0           | 6.38           | 53.6    | 128     | 76.1 | 153 | 26 | 11 |
| 597                       | STANDER              | 6     | 29.8           | 64.1  | 47                | 78.5           | 2.6           | 1               | 12.4           | 6.50           | 55.5    | 129     | 75.1 | 162 | 21 | 19 |
| 598                       | FOSTER               | 6     | 31.4           | 70.4  | 39                | 76.9           | 2.1           | 1               | 11.8           | 5.60           | 49.2    | 134     | 64.8 | 239 | 29 | 7  |
| 599                       | DRUMMOND             | 6     | 30.9           | 65.3  | 52                | 76.9           | 2.0           | 1               | 13.1           | 5.76           | 45.9    | 164     | 65.4 | 204 | 26 | 11 |
| 600                       | ND18662              | 6     | 30.4           | 72.1  | 55                | 76.9           | 2.2           | 2               | 12.8           | 6.06           | 50.1    | 147     | 61.9 | 314 | 20 | 20 |
| 601                       | ND18673              | 6     | 29.5           | 59.2  | 52                | 76.7           | 2.2           | 2               | 12.9           | 5.49           | 44.3    | 157     | 63.6 | 164 | 26 | 11 |
| 602                       | ND18674              | 6     | 30.3           | 67.1  | 53                | 76.4           | 1.9           | 2               | 13.4           | 5.27           | 40.7    | 167     | 58.2 | 246 | 33 | 5  |
| 603                       | ND18683              | 6     | 30.8           | 76.0  | 49                | 76.4           | 2.0           | 2               | 12.3           | 5.25           | 44.3    | 157     | 62.7 | 142 | 44 | 1  |
| 605                       | ND18684              | 6     | 32.1           | 75.0  | 44                | 77.3           | 2.2           | 2               | 12.6           | 5.68           | 47.7    | 146     | 67.2 | 168 | 27 | 10 |
| 606                       | ND18726              | 6     | 31.5           | 72.6  | 50                | 75.5           | 2.1           | 2               | 13.4           | 6.03           | 44.8    | 136     | 73.8 | 315 | 22 | 16 |
| 607                       | ND18731              | 6     | 33.7           | 75.3  | 50                | 76.9           | 1.8           | 2               | 12.7           | 5.55           | 45.6    | 137     | 65.1 | 142 | 33 | 5  |
| 608                       | ND18734              | 6     | 33.0           | 71.2  | 45                | 76.3           | n.d.          | 3               | 13.3           | 5.36           | 42.5    | 158     | 48.8 | 212 | 38 | 3  |
| 609                       | ND18742              | 6     | 32.4           | 91.1  | 53                | 76.5           | n.d.          | 3               | 13.3           | 5.31           | 42.2    | 145     | 59.2 | 195 | 37 | 4  |
| 610                       | ND18743              | 6     | 28.3           | 45.8  | 50                | 76.6           | 2.1           | 2               | 12.8           | 5.72           | 45.3    | 177     | 70.5 | 152 | 19 | 22 |
| 611                       | ND18744              | 6     | 34.8           | 80.2  | 49                | 77.2           | 2.0           | 2               | 13.0           | 5.67           | 46.1    | 152     | 68.1 | 207 | 29 | 7  |
| 612                       | ND18749              | 6     | 30.1           | 63.4  | 50                | 76.8           | 2.5           | 1               | 12.8           | 6.60           | 54.3    | 139     | 88.2 | 116 | 22 | 16 |
| 613                       | ND18750              | 6     | 33.0           | 68.1  | 49                | 77.0           | 2.3           | 1               | 13.6           | 6.56           | 50.5    | 163     | 83.5 | 102 | 23 | 15 |
| 614                       | ND18757              | 6     | 27.7           | 45.1  | 59                | 77.5           | 1.9           | 2               | 12.3           | 5.07           | 43.3    | 168     | 54.9 | 149 | 41 | 2  |
| 615                       | ND18765              | 6     | 30.7           | 65.4  | 49                | 78.1           | 2.5           | 1               | 12.8           | 6.65           | 53.2    | 153     | 80.9 | 124 | 29 | 7  |
| 616                       | ND18771              | 6     | 32.9           | 74.1  | 46                | 78.2           | 2.3           | 1               | 12.8           | 6.14           | 49.9    | 138     | 75.6 | 76  | 26 | 11 |
| 617                       | ND18775              | 6     | 31.9           | 68.5  | 51                | 75.8           | 2.0           | 1               | 13.7           | 5.67           | 43.0    | 186     | 62.5 | 230 | 22 | 16 |
| 604                       | MOREX MALT CHECK     | 6     | 31.2           | 73.8  | 72                | 78.8           | 1.6           | 2               | 12.2           | 5.68           | 48.9    | 145     | 60.6 | 97  | 39 |    |
| Minima                    |                      |       | 27.7           | 45.1  | 39                | 75.5           | 1.8           |                 | 11.8           | 5.07           | 40.7    | 128     | 48.8 | 76  | 19 |    |
| Maxima                    |                      |       | 34.8           | 91.1  | 59                | 78.5           | 2.6           |                 | 13.7           | 6.65           | 55.5    | 186     | 88.2 | 315 | 44 |    |
| Means                     |                      |       | 31.1           | 69.0  | 49                | 77.0           | 2.2           |                 | 12.9           | 5.84           | 47.4    | 151     | 68.1 | 178 | 28 |    |
| Standard Deviations       |                      |       | 1.8            | 10.3  | 4                 | 0.8            | 0.2           |                 | 0.5            | 0.48           | 4.3     | 16      | 9.5  | 64  | 7  |    |
| Coefficients of Variation |                      |       | 5.9            | 15.0  | 9                 | 1.0            | 11.3          |                 | 3.8            | 8.24           | 9.1     | 10      | 14.0 | 36  | 26 |    |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by R.D. Horsley and J.D. Franckowiak, North Dakota State University - Fargo

## 2000 EXPERIMENT 24, PRELIMINARY YIELD TRIAL - FARGO, ND

Table 33

| Lab No. | Variety or Selection | Rowed    | Kernel | on    | Barley  | Malt    | Barley | Wort    | Alpha-  | Beta- | Overall |        |         |       |      |    |
|---------|----------------------|----------|--------|-------|---------|---------|--------|---------|---------|-------|---------|--------|---------|-------|------|----|
|         |                      |          | Weight | 6/64" | Color   | Extract | Wort   | Protein | S/T     | DP    | amylase | glucan | Quality | Score | Rank |    |
| (mg)    | (%)                  | (Agtron) | (%)    | Color | Clarity | (%)     | (%)    | (°ASBC) | (20°DU) | (ppm) |         |        |         |       |      |    |
| 618     | MOREX                | 6        | 28.4   | 42.6  | 47      | 76.1    | 2.0    | 1       | 13.4    | 5.86  | 45.1    | 167    | 68.0    | 91    | 28   | 10 |
| 619     | ROBUST               | 6        | 30.3   | 55.6  | 46      | 76.9    | 1.8    | 1       | 13.9    | 5.85  | 43.6    | 187    | 53.8    | 164   | 29   | 7  |
| 620     | STANDER              | 6        | 30.2   | 64.5  | 46      | 78.5    | 2.5    | 1       | 12.5    | 6.62  | 56.4    | 139    | 82.4    | 111   | 31   | 4  |
| 621     | FOSTER               | 6        | 31.8   | 70.2  | 39      | 76.6    | 2.1    | 1       | 12.2    | 5.61  | 46.9    | 151    | 62.1    | 238   | 32   | 2  |
| 622     | DRUMMOND             | 6        | 29.4   | 55.9  | 52      | 77.1    | 1.8    | 1       | 12.9    | 5.52  | 44.3    | 190    | 64.6    | 104   | 24   | 23 |
| 623     | ND18778              | 6        | 28.8   | 59.4  | 50      | 77.7    | 1.8    | 1       | 12.9    | 5.77  | 45.8    | 171    | 68.1    | 63    | 20   | 33 |
| 624     | ND18781              | 6        | 30.3   | 64.9  | 44      | 79.1    | 2.4    | 1       | 12.9    | 6.34  | 51.9    | 165    | 85.1    | 47    | 25   | 16 |
| 625     | ND18793              | 6        | 31.9   | 66.8  | 43      | 76.6    | 2.1    | 1       | 12.8    | 5.74  | 46.7    | 159    | 67.4    | 178   | 24   | 23 |
| 626     | ND18795              | 6        | 30.7   | 57.9  | 51      | 76.9    | 2.2    | 1       | 12.7    | 6.29  | 49.8    | 170    | 74.0    | 111   | 22   | 27 |
| 627     | ND18796              | 6        | 31.5   | 67.7  | 48      | 77.4    | 2.1    | 1       | 12.4    | 5.81  | 48.3    | 161    | 68.7    | 109   | 30   | 6  |
| 629     | ND18797              | 6        | 30.8   | 63.0  | 50      | 76.6    | 2.1    | 1       | 12.9    | 6.09  | 49.0    | 154    | 69.3    | 106   | 25   | 16 |
| 630     | ND18800              | 6        | 30.6   | 62.0  | 47      | 77.2    | 2.2    | 1       | 13.1    | 5.97  | 47.2    | 166    | 74.0    | 133   | 25   | 16 |
| 631     | ND18802              | 6        | 33.0   | 65.3  | 49      | 77.1    | 2.1    | 1       | 12.6    | 5.83  | 47.5    | 169    | 67.0    | 156   | 22   | 27 |
| 632     | ND18803              | 6        | 33.5   | 73.8  | 45      | 77.3    | 2.2    | 1       | 12.7    | 5.76  | 46.8    | 172    | 63.4    | 158   | 21   | 32 |
| 633     | ND18804              | 6        | 32.8   | 68.7  | 53      | 76.7    | 2.0    | 1       | 13.3    | 6.00  | 45.5    | 205    | 67.9    | 183   | 23   | 26 |
| 634     | ND18805              | 6        | 32.4   | 92.2  | 50      | 76.9    | 1.9    | 1       | 13.9    | 5.92  | 44.5    | 203    | 67.3    | 146   | 32   | 2  |
| 635     | ND18806              | 6        | 30.9   | 59.3  | 48      | 75.3    | 2.2    | 1       | 12.7    | 5.62  | 44.3    | 171    | 82.4    | 80    | 26   | 12 |
| 636     | ND18807              | 6        | 32.3   | 65.4  | 47      | 76.1    | 2.2    | 1       | 13.1    | 6.06  | 46.7    | 174    | 71.6    | 84    | 19   | 34 |
| 637     | ND18808              | 6        | 31.3   | 69.4  | 47      | 77.4    | 2.7    | 1       | 13.0    | 6.84  | 54.0    | 168    | 86.1    | 82    | 22   | 27 |
| 638     | ND18810              | 6        | 29.2   | 40.5  | 53      | 76.4    | 1.8    | 1       | 13.3    | 5.70  | 44.4    | 199    | 71.8    | 135   | 24   | 23 |
| 639     | ND18811              | 6        | 31.3   | 60.2  | 51      | 76.7    | 1.9    | 1       | 13.0    | 5.78  | 45.4    | 210    | 69.7    | 106   | 26   | 12 |
| 640     | ND18812              | 6        | 31.3   | 57.6  | 50      | 75.8    | 2.1    | 1       | 14.0    | 6.04  | 44.5    | 195    | 73.6    | 114   | 18   | 35 |
| 641     | ND18814              | 6        | 31.1   | 59.1  | 50      | 77.7    | 3.2    | 1       | 13.0    | 7.12  | 56.3    | 125    | 95.8    | 105   | 18   | 35 |
| 642     | ND18815              | 6        | 31.4   | 63.3  | 51      | 78.7    | 3.0    | 1       | 12.6    | 6.79  | 56.3    | 123    | 94.3    | 84    | 22   | 27 |
| 643     | ND18816              | 6        | 31.1   | 62.1  | 47      | 76.9    | 2.2    | 1       | 12.8    | 6.07  | 50.7    | 158    | 77.0    | 114   | 25   | 19 |
| 644     | ND18819              | 6        | 32.7   | 70.1  | 42      | 77.4    | 3.0    | 1       | 12.8    | 6.90  | 56.0    | 113    | 88.7    | 185   | 18   | 35 |
| 645     | ND18825              | 6        | 31.3   | 64.5  | 51      | 77.4    | 2.1    | 1       | 13.0    | 5.98  | 47.5    | 174    | 75.9    | 158   | 17   | 38 |
| 646     | ND18826              | 6        | 31.2   | 62.5  | 51      | 77.5    | 2.0    | 1       | 12.7    | 5.73  | 47.3    | 167    | 72.7    | 129   | 25   | 16 |
| 647     | ND18828              | 6        | 31.7   | 74.0  | 46      | 77.1    | 1.9    | 1       | 12.7    | 5.67  | 45.5    | 170    | 75.2    | 192   | 25   | 16 |
| 648     | ND18830              | 6        | 31.5   | 76.9  | 47      | 76.8    | 2.1    | 1       | 12.7    | 5.67  | 45.6    | 162    | 72.4    | 210   | 29   | 7  |

Table 33

| Lab No.                   | Variety or Selection | Rowed | Kernel | on    | Barley | Malt    | Barley | Wort | Alpha-  | Beta-   | Overall |         |        |         |       |      |
|---------------------------|----------------------|-------|--------|-------|--------|---------|--------|------|---------|---------|---------|---------|--------|---------|-------|------|
|                           |                      |       | Weight | 6/64" | Color  | Extract | Wort   | Wort | Protein | Protein |         | amylase | glucan | Quality | Score | Rank |
| 649                       | ND18831              | 6     | 31.9   | 75.7  | 51     | 76.8    | 2.0    | 1    | 12.8    | 5.66    | 45.6    | 124     | 71.0   | 238     | 25    | 16   |
| 650                       | ND18832              | 6     | 32.5   | 76.8  | 50     | 77.0    | 1.9    | 1    | 13.0    | 5.61    | 45.3    | 117     | 65.3   | 213     | 26    | 12   |
| 651                       | ND18833              | 6     | 32.3   | 62.4  | 53     | 78.4    | 1.9    | 1    | 12.9    | 5.81    | 46.9    | 156     | 67.5   | 173     | 29    | 7    |
| 653                       | ND18835              | 6     | 28.7   | 50.8  | 47     | 77.4    | 1.9    | 1    | 12.4    | 5.25    | 43.9    | 141     | 63.6   | 319     | 33    | 1    |
| 654                       | ND18843              | 6     | 31.8   | 67.5  | 53     | 78.2    | 1.7    | 1    | 13.8    | 5.70    | 43.7    | 189     | 63.7   | 174     | 26    | 12   |
| 655                       | ND18844              | 6     | 32.6   | 69.6  | 51     | 78.1    | 1.9    | 1    | 13.2    | 5.53    | 44.2    | 174     | 58.7   | 155     | 31    | 4    |
| 656                       | ND18849              | 6     | 28.1   | 55.8  | 52     | 77.4    | 1.7    | 1    | 13.1    | 5.39    | 44.0    | 153     | 65.8   | 259     | 27    | 11   |
| 657                       | ND18855              | 6     | 27.5   | 44.2  | 52     | 77.0    | 1.7    | 1    | 13.0    | 5.54    | 43.2    | 163     | 67.9   | 241     | 22    | 27   |
| 628                       | MOREX MALT CHECK     | 6     | 31.4   | 74.3  | 71     | 78.9    | 1.7    | 1    | 12.5    | 5.70    | 48.8    | 147     | 64.9   | 96      | 40    |      |
| 652                       | MOREX MALT CHECK     | 6     | 31.3   | 72.4  | 72     | 80.8    | 1.9    | 1    | 12.3    | 6.53    | 56.0    | 133     | 79.0   | 98      | 40    |      |
| Minima                    |                      |       | 27.5   | 40.5  | 39     | 75.3    | 1.7    |      | 12.2    | 5.25    | 43.2    | 113     | 53.8   | 47      | 17    |      |
| Maxima                    |                      |       | 33.5   | 92.2  | 53     | 79.1    | 3.2    |      | 14.0    | 7.12    | 56.4    | 210     | 95.8   | 319     | 33    |      |
| Means                     |                      |       | 31.1   | 63.6  | 49     | 77.2    | 2.1    |      | 13.0    | 5.93    | 47.4    | 165     | 71.9   | 149     | 25    |      |
| Standard Deviations       |                      |       | 1.4    | 9.9   | 3      | 0.8     | 0.4    |      | 0.4     | 0.43    | 3.9     | 24      | 9.2    | 60      | 4     |      |
| Coefficients of Variation |                      |       | 4.6    | 15.5  | 7      | 1.0     | 16.7   |      | 3.2     | 7.23    | 8.1     | 15      | 12.8   | 41      | 17    |      |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by R.D. Horsley and J.D. Franckowiak, North Dakota State University - Fargo

## 2000 EXPERIMENT LA41, LANGDON PRELIMINARY TRIAL - LANGDON, ND

Table 34

| Lab No.                   | Variety or Selection  | Rowed | Kernel Weight (mg) | on 6/64" | Barley Color (Agtron) | Malt Extract (%) | Wort Color (%) | Wort Clarity | Barley Protein (%) | Wort Protein (%) | S/T (%) | DP (%ASBC) | Alpha-amylase (20°DU) | Beta-glucan (ppm) | Quality Score | Overall Rank |
|---------------------------|-----------------------|-------|--------------------|----------|-----------------------|------------------|----------------|--------------|--------------------|------------------|---------|------------|-----------------------|-------------------|---------------|--------------|
| 801                       | STANDER               | 6     | 33.9               | 82.8     | 37                    | 80.0             | 2.4            | 1            | 13.8               | 6.84             | 50.7    | 159        | 82.2                  | 270               | 34            | 2            |
| 802                       | DRUMMOND              | 6     | 31.9               | 83.6     | 40                    | 79.4             | 2.1            | 1            | 14.5               | 6.53             | 46.4    | 188        | 67.8                  | 182               | 21            | 9            |
| 803                       | CONLON                | 2     | 37.1               | 80.3     | 36                    | 78.3             | 1.7            | 1            | 14.5               | 5.38             | 38.9    | 137        | 64.8                  | 279               | 16            | 17           |
| 804                       | ND16461-1             | 2     | 39.7               | 86.4     | 40                    | 80.0             | 1.6            | 1            | 11.4               | 4.82             | 43.7    | 83         | 62.9                  | 395               | 36            | 1            |
| 805                       | 2N18894               | 2     | 41.8               | 89.4     | 37                    | 79.0             | 1.9            | 1            | 13.7               | 5.37             | 39.9    | 135        | 58.2                  | 409               | 20            | 11           |
| 806                       | 2N18895               | 2     | 40.3               | 87.0     | 39                    | 79.9             | 2.2            | 1            | 13.7               | 5.82             | 42.9    | 117        | 60.5                  | 353               | 31            | 3            |
| 807                       | 2N18896               | 2     | 39.5               | 85.8     | 32                    | 79.7             | 2.0            | 1            | 13.5               | 5.63             | 43.6    | 107        | 54.5                  | 338               | 30            | 5            |
| 808                       | 2N18899               | 2     | 37.8               | 84.8     | 38                    | 79.7             | 1.9            | 1            | 14.0               | 6.14             | 46.0    | 134        | 62.9                  | 230               | 16            | 17           |
| 809                       | 2N18900               | 2     | 35.0               | 82.8     | 43                    | 79.1             | 1.7            | 1            | 12.7               | 5.12             | 42.8    | 96         | 67.4                  | 178               | 26            | 6            |
| 810                       | 2N18908               | 2     | 35.2               | 79.8     | 39                    | 80.3             | 2.2            | 1            | 14.6               | 6.17             | 42.6    | 142        | 63.6                  | 268               | 17            | 15           |
| 811                       | 2N18915               | 2     | 36.4               | 87.6     | 27                    | 79.4             | 2.2            | 1            | 14.6               | 6.18             | 41.3    | 150        | 67.7                  | 337               | 17            | 15           |
| 812                       | 2N18917               | 2     | 37.8               | 88.6     | 44                    | 79.5             | 2.1            | 1            | 13.8               | 5.81             | 42.1    | 140        | 51.8                  | 181               | 31            | 3            |
| 813                       | 2N18919               | 2     | 36.2               | 78.9     | 41                    | 80.0             | 2.9            | 1            | 12.9               | 6.63             | 50.6    | 132        | 69.7                  | 162               | 21            | 9            |
| 814                       | 2N18920               | 2     | 37.9               | 86.0     | 38                    | 82.3             | *3.5           | 1            | 14.5               | 8.11             | 57.8    | 164        | 73.6                  | 201               | 18            | 14           |
| 815                       | 2N18921               | 2     | 36.9               | 85.2     | 37                    | 79.8             | 2.3            | 1            | 14.7               | 6.55             | 45.2    | 162        | 56.0                  | 253               | 20            | 11           |
| 816                       | 2N18923               | 2     | 35.9               | 84.2     | 38                    | 78.0             | 1.9            | 1            | 15.2               | 5.65             | 36.7    | 179        | 56.3                  | 347               | 9             | 21           |
| 817                       | 2N18924               | 2     | 35.7               | 78.0     | 38                    | 76.7             | 1.6            | 1            | 14.9               | 5.26             | 34.6    | 133        | 47.9                  | 340               | 16            | 17           |
| 819                       | 2N18926               | 2     | 37.3               | 79.7     | 38                    | 77.9             | 2.3            | 1            | 15.5               | 5.73             | 37.0    | 157        | 60.4                  | 385               | 5             | 22           |
| 820                       | 2N18927               | 2     | 35.1               | 76.2     | 35                    | 78.1             | 1.9            | 1            | 13.7               | 4.89             | 37.6    | 138        | 49.8                  | 409               | 24            | 8            |
| 821                       | 2N18930               | 2     | 35.0               | 79.2     | 36                    | 77.9             | 1.7            | 1            | 14.5               | 5.51             | 38.2    | 135        | 54.0                  | 343               | 13            | 20           |
| 822                       | 2N18932               | 2     | 40.7               | 87.9     | 36                    | 75.8             | 1.6            | 1            | 14.3               | 5.12             | 35.5    | 136        | 54.5                  | 384               | 20            | 11           |
| 823                       | 2N18934               | 2     | 41.4               | 87.5     | 33                    | 76.3             | 1.7            | 1            | 14.5               | 5.11             | 35.5    | 128        | 47.6                  | 335               | 26            | 6            |
| 818                       | HARRINGTON MALT CHECK | 2     | 36.5               | 88.8     | 64                    | 79.8             | 2.1            | 2            | 11.9               | 5.36             | 45.9    | 93         | 51.4                  | 304               | 33            |              |
| Minima                    |                       |       | 31.9               | 76.2     | 27                    | 75.8             | 1.6            |              | 11.4               | 4.82             | 34.6    | 83         | 47.6                  | 162               | 5             |              |
| Maxima                    |                       |       | 41.8               | 89.4     | 44                    | 82.3             | 2.9            |              | 15.5               | 8.11             | 57.8    | 188        | 82.2                  | 409               | 36            |              |
| Means                     |                       |       | 37.2               | 83.7     | 37                    | 79.0             | 2.0            |              | 14.1               | 5.83             | 42.3    | 139        | 60.6                  | 299               | 21            |              |
| Standard Deviations       |                       |       | 2.5                | 3.9      | 4                     | 1.5              | 0.3            |              | 0.9                | 0.77             | 5.8     | 25         | 8.7                   | 82                | 8             |              |
| Coefficients of Variation |                       |       | 6.8                | 4.6      | 10                    | 1.9              | 16.1           |              | 6.4                | 13.24            | 13.6    | 18         | 14.4                  | 27                | 37            |              |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by J.D. Frankowiak and R.D. Horsley, North Dakota State University - Fargo

## 2000 EXPERIMENT LA42, LANGDON PRELIMINARY TRIAL - LANGDON, ND

Table 35

| Lab No.                   | Variety or Selection  | Rowed | Kernel Weight (mg) | on 6/64" | Barley Color (Agron) | Malt Extract (%) | Wort Color | Wort Clarity | Barley Protein (%) | Wort Protein (%) | S/T (%) | DP (°ASBC) | Alpha-amylase (20°DU) | Beta-glucan (ppm) | Quality Score | Overall Rank |
|---------------------------|-----------------------|-------|--------------------|----------|----------------------|------------------|------------|--------------|--------------------|------------------|---------|------------|-----------------------|-------------------|---------------|--------------|
| 824                       | STANDER               | 6     | 31.4               | 78.5     | 43                   | 79.8             | 2.8        | 1            | 13.8               | 6.96             | 51.9    | 169        | 78.6                  | 158               | 30            | 2            |
| 825                       | DRUMMOND              | 6     | 30.6               | 73.9     | 41                   | 77.9             | 1.9        | 1            | 14.9               | 6.00             | 42.0    | 210        | 64.8                  | 162               | 20            | 12           |
| 826                       | CONLON                | 2     | 34.3               | 73.2     | 34                   | 77.1             | 1.7        | 1            | 14.8               | 5.34             | 36.7    | 157        | 63.1                  | 300               | 8             | 25           |
| 827                       | ND16461-1             | 2     | 34.7               | 74.1     | 36                   | 77.0             | 1.8        | 1            | 14.0               | 5.22             | 37.3    | 115        | 62.6                  | 382               | 12            | 23           |
| 828                       | 2N18939               | 2     | 36.7               | 86.5     | 40                   | 78.9             | 2.0        | 1            | 15.0               | 5.70             | 39.7    | 161        | 65.6                  | 292               | 15            | 20           |
| 829                       | 2N18940               | 2     | 38.2               | 88.6     | 36                   | 79.1             | 2.2        | 1            | 14.0               | 5.58             | 40.3    | 162        | 66.6                  | 335               | 19            | 13           |
| 830                       | 2N18941               | 2     | 34.8               | 85.8     | 41                   | 78.6             | 2.2        | 1            | 14.9               | 6.20             | 41.7    | 169        | 60.3                  | 279               | 17            | 15           |
| 831                       | 2N18942               | 2     | 36.1               | 85.5     | 39                   | 78.9             | 2.4        | 1            | 14.4               | 6.41             | 45.7    | 191        | 60.7                  | 330               | 14            | 21           |
| 832                       | 2N18943               | 2     | 36.4               | 82.2     | 40                   | 78.5             | 2.6        | 1            | 14.9               | 6.41             | 44.5    | 179        | 66.9                  | 400               | 11            | 24           |
| 833                       | 2N18944               | 2     | 39.4               | 90.3     | 37                   | 80.6             | 3.3        | 1            | 13.1               | 6.83             | 51.4    | 107        | 68.5                  | 64                | 28            | 3            |
| 834                       | 2N18945               | 2     | 33.6               | 70.4     | 32                   | 78.9             | 3.5        | 1            | 15.5               | 7.29             | 46.2    | 142        | 70.7                  | 132               | 13            | 22           |
| 835                       | 2N18946               | 2     | 36.3               | 75.2     | 32                   | 77.2             | 2.2        | 1            | 15.1               | 5.69             | 37.9    | 159        | 55.5                  | 295               | 8             | 25           |
| 836                       | 2N18947               | 2     | 34.6               | 71.4     | 35                   | 77.9             | 2.1        | 1            | 14.7               | 5.53             | 37.6    | 131        | 50.5                  | 275               | 16            | 17           |
| 837                       | 2N18948               | 2     | 38.3               | 89.2     | 47                   | 81.3             | 2.0        | 1            | *11.9              | 5.11             | 44.0    | 96         | 56.8                  | 244               | 42            | 1            |
| 839                       | 2N18949               | 2     | 37.3               | 84.2     | 41                   | 78.5             | 2.3        | 1            | 13.8               | 5.45             | 40.0    | 95         | 48.5                  | 332               | 21            | 11           |
| 840                       | 2N18950               | 2     | 38.6               | 83.6     | 38                   | 78.6             | 2.4        | 1            | 13.9               | 5.29             | 38.8    | 93         | 48.3                  | 316               | 18            | 14           |
| 841                       | 2N18951               | 2     | 35.9               | 85.4     | 39                   | 77.7             | 2.0        | 1            | 14.4               | 5.06             | 36.5    | 118        | 51.0                  | 336               | 23            | 7            |
| 842                       | 2N18952               | 2     | 33.6               | 72.8     | 34                   | 77.0             | 2.3        | 1            | 14.6               | 5.22             | 37.2    | 119        | 52.6                  | 312               | 16            | 17           |
| 843                       | 2N18953               | 2     | 34.6               | 80.2     | 43                   | 80.3             | 2.6        | 1            | 14.6               | 6.50             | 44.9    | 163        | 68.1                  | 265               | 17            | 15           |
| 844                       | 2N18957               | 2     | 40.4               | 91.3     | 36                   | 78.3             | 3.8        | 1            | 14.8               | 7.30             | 50.7    | 134        | 67.4                  | 284               | 22            | 9            |
| 845                       | 2N18958               | 2     | 42.0               | 94.4     | 39                   | 81.6             | 2.6        | 1            | 13.7               | 6.62             | 49.7    | 119        | 71.6                  | 308               | 28            | 3            |
| 846                       | 2N18965               | 2     | 33.8               | 73.6     | 33                   | 79.9             | 2.1        | 1            | 13.7               | 5.90             | 42.4    | 126        | 67.6                  | 267               | 27            | 5            |
| 847                       | 2N18966               | 2     | 38.5               | 83.4     | 40                   | 76.6             | 2.1        | 1            | 13.4               | 5.35             | 41.2    | 124        | 62.7                  | 300               | 27            | 5            |
| 848                       | 2N18968               | 2     | 33.1               | 70.2     | 35                   | 77.7             | 2.0        | 1            | 14.3               | 5.07             | 37.1    | 155        | 49.2                  | 433               | 16            | 17           |
| 849                       | 2N18975               | 2     | 35.6               | 72.3     | 37                   | 78.4             | 2.0        | 1            | 14.7               | 5.42             | 38.1    | 125        | 48.2                  | 322               | 23            | 7            |
| 850                       | 2N18977               | 2     | 39.2               | 82.9     | 45                   | 78.7             | 1.8        | 1            | 14.1               | 5.11             | 36.6    | 138        | 49.0                  | 327               | 22            | 9            |
| 838                       | HARRINGTON MALT CHECK | 2     | 35.8               | 89.9     | 57                   | 79.5             | n.d.       | 3            | 12.4               | 5.31             | 45.3    | 108        | 56.3                  | 392               | 32            |              |
| Minima                    |                       |       | 30.6               | 70.2     | 32                   | 76.6             | 1.7        |              | 13.1               | 5.06             | 36.5    | 93         | 48.2                  | 64                | 8             |              |
| Maxima                    |                       |       | 42.0               | 94.4     | 47                   | 81.6             | 3.8        |              | 15.5               | 7.30             | 51.9    | 210        | 78.6                  | 433               | 42            |              |
| Means                     |                       |       | 36.1               | 80.7     | 38                   | 78.7             | 2.3        |              | 14.4               | 5.87             | 41.9    | 141        | 60.6                  | 287               | 20            |              |
| Standard Deviations       |                       |       | 2.7                | 7.3      | 4                    | 1.3              | 0.5        |              | 0.6                | 0.71             | 4.9     | 30         | 8.7                   | 81                | 8             |              |
| Coefficients of Variation |                       |       | 7.6                | 9.0      | 10                   | 1.7              | 22.5       |              | 4.1                | 12.13            | 11.7    | 22         | 14.4                  | 28                | 39            |              |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by J.D. Frankowiak and R.D. Horsley, North Dakota State University - Fargo

## 2000 EXPERIMENT LA43, LANGDON PRELIMINARY TRIAL - LANGDON, ND

Table 36

| Lab No.                   | Variety or Selection  | Rowed | Kernel          | on   | Barley            | Malt           | Barley        | Wort            | Alpha-         | Beta-          | Quality | Overall |      |     |    |    |
|---------------------------|-----------------------|-------|-----------------|------|-------------------|----------------|---------------|-----------------|----------------|----------------|---------|---------|------|-----|----|----|
|                           |                       |       | Weight<br>6/64" | (mg) | Color<br>(Agtron) | Extract<br>(%) | Wort<br>Color | Wort<br>Clarity | Protein<br>(%) | Protein<br>(%) |         |         |      |     |    |    |
| 851                       | STANDER               | 6     | 31.2            | 66.1 | 39                | 78.9           | 3.3           | 1               | 14.7           | 7.58           | 53.8    | 185     | 72.9 | 162 | 16 | 13 |
| 852                       | DRUMMOND              | 6     | 32.0            | 78.0 | 49                | 78.7           | 2.4           | 1               | 13.4           | 6.37           | 49.1    | 208     | 65.0 | 82  | 27 | 4  |
| 853                       | CONLON                | 2     | 37.6            | 82.5 | 36                | 78.6           | 2.0           | 1               | 14.7           | 5.44           | 39.2    | 161     | 61.0 | 296 | 12 | 18 |
| 854                       | ND16461-1             | 2     | 38.2            | 82.6 | 40                | 78.9           | 2.0           | 1               | 12.7           | 5.25           | 41.7    | 113     | 56.9 | 411 | 28 | 3  |
| 855                       | 2N18981               | 2     | 39.2            | 87.8 | 50                | 80.2           | 1.8           | 1               | 13.3           | 5.44           | 41.5    | 107     | 50.3 | 469 | 35 | 1  |
| 856                       | 2N18986               | 2     | 33.4            | 70.5 | 39                | 76.1           | 2.1           | 1               | 14.4           | 5.13           | 36.2    | 133     | 51.5 | 365 | 13 | 17 |
| 857                       | 2N18987               | 2     | 37.7            | 85.7 | 40                | 79.6           | 2.2           | 1               | 13.2           | 5.81           | 44.8    | 130     | 54.6 | 447 | 33 | 2  |
| 859                       | 2N18989               | 2     | 38.9            | 90.3 | 40                | 80.3           | 2.8           | 1               | 14.9           | 6.84           | 46.5    | 127     | 59.7 | 482 | 23 | 8  |
| 860                       | 2N18990               | 2     | 40.0            | 92.6 | 42                | 82.0           | 2.7           | 1               | 13.7           | 6.72           | 50.9    | 119     | 64.2 | 415 | 26 | 5  |
| 861                       | 2N18992               | 2     | 38.8            | 87.4 | 39                | 79.7           | 2.4           | 1               | 13.5           | 6.06           | 47.0    | 127     | 59.8 | 392 | 21 | 9  |
| 862                       | 2N18995               | 2     | 39.0            | 90.6 | 48                | 79.8           | 2.3           | 1               | 15.1           | 6.82           | 47.2    | 139     | 60.1 | 449 | 20 | 11 |
| 863                       | 2N18996               | 2     | 41.5            | 90.5 | 38                | 80.2           | 2.5           | 1               | 15.2           | 7.02           | 47.1    | 128     | 61.1 | 473 | 25 | 6  |
| 864                       | 2N18997               | 2     | 38.4            | 87.1 | 41                | 79.5           | 1.6           | 1               | 13.7           | 5.80           | 43.1    | 157     | 60.5 | 265 | 25 | 6  |
| 865                       | 2N18998               | 2     | 37.1            | 84.3 | 34                | 80.8           | 1.9           | 1               | 13.9           | 6.34           | 47.7    | 114     | 68.9 | 778 | 16 | 13 |
| 866                       | 2N18999               | 2     | 35.6            | 76.2 | 35                | 79.2           | 1.7           | 1               | 15.1           | 6.03           | 41.2    | 150     | 60.5 | 307 | 11 | 19 |
| 867                       | 2N119003              | 2     | 35.6            | 78.2 | 36                | 76.6           | 2.1           | 1               | 16.4           | 6.28           | 38.5    | 156     | 55.3 | 418 | 2  | 22 |
| 868                       | 2N19008               | 2     | 38.5            | 79.8 | 32                | 77.6           | 1.5           | 1               | 14.4           | 5.14           | 37.7    | 128     | 46.0 | 511 | 21 | 9  |
| 869                       | 2N19012               | 2     | 36.9            | 77.0 | 37                | 79.5           | 2.3           | 1               | 13.8           | 6.41           | 47.6    | 140     | 79.7 | 408 | 9  | 20 |
| 870                       | 2N19018               | 2     | 36.1            | 71.5 | 32                | 80.0           | 2.6           | 1               | 15.4           | 6.58           | 44.2    | 160     | 66.4 | 472 | 14 | 16 |
| 871                       | 2N19019               | 2     | 36.3            | 76.4 | 40                | 76.6           | 1.7           | 2               | 13.9           | 5.40           | 39.1    | 129     | 52.1 | 444 | 15 | 15 |
| 872                       | 2N19023               | 2     | 36.8            | 82.0 | 42                | 77.7           | 1.7           | 2               | 13.2           | 4.96           | 38.6    | 90      | 53.6 | 528 | 17 | 12 |
| 873                       | 2N19024               | 2     | 36.7            | 78.4 | 40                | 77.9           | 1.5           | 1               | 13.5           | 5.11           | 39.1    | 94      | 60.1 | 572 | 5  | 21 |
| 858                       | HARRINGTON MALT CHECK | 2     | 36.5            | 89.6 | 62                | 80.0           | 2.0           | 1               | 12.7           | 5.55           | 46.5    | 103     | 51.8 | 327 | 28 |    |
| Minima                    |                       |       | 31.2            | 66.1 | 32                | 76.1           | 1.5           |                 | 12.7           | 4.96           | 36.2    | 90      | 46.0 | 82  | 2  |    |
| Maxima                    |                       |       | 41.5            | 92.6 | 50                | 82.0           | 3.3           |                 | 16.4           | 7.58           | 53.8    | 208     | 79.7 | 778 | 35 |    |
| Means                     |                       |       | 37.1            | 81.6 | 40                | 79.0           | 2.1           |                 | 14.2           | 6.03           | 43.7    | 136     | 60.0 | 416 | 19 |    |
| Standard Deviations       |                       |       | 2.5             | 7.1  | 5                 | 1.5            | 0.5           |                 | 0.9            | 0.73           | 4.8     | 28      | 7.7  | 142 | 9  |    |
| Coefficients of Variation |                       |       | 6.7             | 8.7  | 12                | 1.8            | 21.9          |                 | 6.4            | 12.16          | 10.9    | 20      | 12.8 | 34  | 45 |    |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by J.D. Frankowiak and R.D. Horsley, North Dakota State University - Fargo

## 2000 EXPERIMENT LA44, LANGDON PRELIMINARY YIELD TRIAL - LANGDON, ND

Table 37

| Lab No.                   | Variety or Selection  | Rowed | Kernel Weight (mg) | on 6/64" | Barley Color (%) | Malt Extract (%) | Wort Color | Wort Clarity | Barley Protein (%) | Wort Protein (%) | S/T (%) | DP (°ASBC) | Alpha-amylase (20°DU) | Beta-glucan (ppm) | Quality Score | Overall Rank |
|---------------------------|-----------------------|-------|--------------------|----------|------------------|------------------|------------|--------------|--------------------|------------------|---------|------------|-----------------------|-------------------|---------------|--------------|
| 874                       | STANDER               | 6     | 30.9               | 66.4     | 44               | 78.4             | 2.5        | 1            | 14.7               | 7.14             | 51.3    | 194        | 83.7                  | 206               | 13            | 19           |
| 875                       | DRUMMOND              | 6     | 31.6               | 77.9     | 45               | 78.4             | 2.0        | 1            | 14.0               | 6.21             | 46.1    | 194        | 67.1                  | 182               | 23            | 6            |
| 876                       | CONLON                | 2     | 36.4               | 78.9     | 34               | 78.0             | 1.8        | 1            | 14.9               | 5.70             | 39.0    | 145        | 69.0                  | 325               | 9             | 21           |
| 877                       | ND16461-1             | 2     | 37.1               | 77.6     | 35               | 77.5             | 1.7        | 1            | 14.2               | 5.44             | 40.6    | 113        | 64.6                  | 386               | 17            | 14           |
| 878                       | 2N19029               | 2     | 36.6               | 86.7     | 46               | 79.1             | 1.6        | 1            | 13.7               | 5.63             | 42.8    | 127        | 55.9                  | 344               | 24            | 5            |
| 880                       | 2N19030               | 2     | 38.0               | 77.5     | 40               | 78.2             | 1.5        | 1            | 14.4               | 5.62             | 39.5    | 134        | 69.0                  | 216               | 18            | 11           |
| 881                       | 2N19032               | 2     | 37.9               | 85.0     | 41               | 78.2             | 1.4        | 1            | 14.4               | 5.24             | 37.8    | 145        | 53.5                  | 324               | 16            | 16           |
| 882                       | 2N19033               | 2     | 38.9               | 86.8     | 38               | 79.0             | 1.5        | 1            | 14.3               | 5.14             | 37.9    | 139        | 52.9                  | 409               | 22            | 7            |
| 883                       | 2N19035               | 2     | 36.6               | 74.5     | 33               | 79.1             | 2.5        | 1            | 14.1               | 6.51             | 47.6    | 127        | 82.7                  | 261               | 16            | 16           |
| 884                       | 2N19036               | 2     | 32.9               | 65.9     | 48               | 76.6             | 1.6        | 1            | 13.8               | 4.95             | 37.7    | 99         | 51.1                  | 385               | 17            | 14           |
| 885                       | 2N19040               | 2     | 34.5               | 78.6     | 46               | 81.3             | 2.1        | 1            | 13.4               | 6.58             | 51.0    | 100        | 61.9                  | 325               | 21            | 9            |
| 886                       | 2N19042               | 2     | 36.3               | 76.1     | 38               | 78.0             | 2.1        | 1            | 14.4               | 6.27             | 44.3    | 128        | 63.2                  | 388               | 18            | 11           |
| 887                       | 2N19047               | 2     | 37.5               | 83.1     | 33               | 78.9             | 2.5        | 1            | 15.1               | 6.72             | 44.7    | 138        | 87.3                  | 287               | 18            | 11           |
| 888                       | 2N19049               | 2     | 37.8               | 80.6     | 35               | 77.1             | 2.0        | 1            | 15.6               | 5.96             | 38.9    | 169        | 76.1                  | 278               | 8             | 22           |
| 889                       | 2N19050               | 2     | 38.6               | 84.7     | 36               | 78.4             | 2.0        | 1            | 14.1               | 6.24             | 43.4    | 142        | 80.9                  | 349               | 13            | 19           |
| 890                       | 2N19051               | 2     | 43.4               | 91.3     | 46               | 80.9             | 1.5        | 1            | 13.4               | 5.88             | 45.0    | 147        | 72.0                  | 444               | 32            | 1            |
| 891                       | 2N19052               | 2     | 43.2               | 89.0     | 45               | 80.9             | 1.5        | 1            | 12.9               | 5.97             | 46.3    | 155        | 68.0                  | 405               | 25            | 4            |
| 892                       | 2N19053               | 2     | 42.2               | 91.8     | 42               | 81.0             | 1.7        | 1            | 12.7               | 5.84             | 45.6    | 140        | 67.0                  | 416               | 32            | 1            |
| 893                       | 2N19054               | 2     | 41.9               | 87.4     | 41               | 80.3             | 1.5        | 1            | 13.2               | 5.77             | 44.7    | 156        | 70.9                  | 421               | 29            | 3            |
| 894                       | 2N19057               | 2     | 35.2               | 80.4     | 37               | 80.3             | 2.2        | 1            | 13.8               | 6.45             | 46.9    | 132        | 95.4                  | 286               | 16            | 16           |
| 895                       | 2N19058               | 2     | 39.6               | 89.2     | 44               | 78.8             | 2.1        | 1            | 14.1               | 6.47             | 45.8    | 140        | 83.6                  | 273               | 19            | 10           |
| 896                       | 2N19060               | 2     | 36.2               | 74.8     | 40               | 80.2             | 1.8        | 1            | 13.0               | 5.63             | 43.7    | 144        | 78.2                  | 427               | 22            | 7            |
| 879                       | HARRINGTON MALT CHECK | 2     | 36.0               | 89.0     | 62               | 80.0             | 1.9        | 2            | 12.4               | 5.40             | 45.1    | 85         | 52.4                  | 450               | 33            |              |
| Minima                    |                       |       | 30.9               | 65.9     | 33               | 76.6             | 1.4        |              | 12.7               | 4.95             | 37.7    | 99         | 51.1                  | 182               | 8             |              |
| Maxima                    |                       |       | 43.4               | 91.8     | 48               | 81.3             | 2.5        |              | 15.6               | 7.14             | 51.3    | 194        | 95.4                  | 444               | 32            |              |
| Means                     |                       |       | 37.4               | 81.1     | 40               | 79.0             | 1.9        |              | 14.0               | 5.97             | 43.7    | 141        | 70.6                  | 334               | 19            |              |
| Standard Deviations       |                       |       | 3.4                | 7.2      | 5                | 1.3              | 0.4        |              | 0.7                | 0.55             | 4.0     | 24         | 11.9                  | 77                | 6             |              |
| Coefficients of Variation |                       |       | 9.0                | 8.9      | 12               | 1.7              | 19.2       |              | 5.1                | 9.19             | 9.2     | 17         | 16.9                  | 23                | 33            |              |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by J.D. Frankowiak and R.D. Horsley, North Dakota State University - Fargo

## 2000 EXPERIMENT LA45, LANGDON PRELIMINARY YIELD TRIAL - LANGDON, ND

Table 38

| Lab No.                   | Variety or Selection  | Rowed | Kernel         | on           | Barley            | Malt           | Barley        | Wort            | Alpha-         | Beta-          | Quality    | Overall       |                    |                 |       |      |
|---------------------------|-----------------------|-------|----------------|--------------|-------------------|----------------|---------------|-----------------|----------------|----------------|------------|---------------|--------------------|-----------------|-------|------|
|                           |                       |       | Weight<br>(mg) | 6/64"<br>(%) | Color<br>(Agtron) | Extract<br>(%) | Wort<br>Color | Wort<br>Clarity | Protein<br>(%) | Protein<br>(%) | S/T<br>(%) | DP<br>(°ASBC) | amylase<br>(20°DU) | glucan<br>(ppm) | Score | Rank |
| 897                       | STANDER               | 6     | 32.8           | 76.2         | 37                | 78.4           | 2.7           | 1               | 14.7           | 7.27           | 50.9       | 174           | 85.1               | 238             | 17    | 13   |
| 898                       | DRUMMOND              | 6     | 31.3           | 68.7         | 42                | 77.4           | 2.0           | 1               | 14.9           | 6.55           | 44.2       | 223           | 69.1               | 168             | 14    | 16   |
| 899                       | CONLON                | 2     | 39.3           | 88.6         | 40                | 79.3           | 1.5           | 1               | 13.1           | 5.23           | 41.3       | 136           | 63.0               | 278             | 31    | 3    |
| 901                       | ND16461-1             | 2     | 37.7           | 78.8         | 38                | 77.9           | 1.7           | 1               | 13.6           | 5.78           | 43.6       | 115           | 63.9               | 420             | 17    | 13   |
| 902                       | 2N19071               | 2     | 38.2           | 83.7         | 34                | 79.4           | 1.8           | 1               | 13.6           | 5.73           | 41.9       | 118           | 62.6               | 370             | 23    | 6    |
| 903                       | 2N19074               | 2     | 37.8           | 91.2         | 41                | 78.4           | 2.2           | 1               | 14.6           | 6.56           | 44.4       | 156           | 66.5               | 282             | 19    | 12   |
| 904                       | 2N19075               | 2     | 36.0           | 81.6         | 35                | 77.7           | 1.9           | 1               | 15.2           | 6.00           | 41.1       | 159           | 67.5               | 314             | 7     | 19   |
| 905                       | 2N19088               | 2     | 34.9           | 79.9         | 37                | 80.4           | 1.8           | 1               | 12.9           | 5.82           | 45.1       | 114           | 73.2               | 314             | 29    | 5    |
| 906                       | 2N19091               | 2     | 38.2           | 85.7         | 39                | 78.1           | 1.8           | 1               | 14.7           | 6.12           | 42.9       | 122           | 67.5               | 460             | 23    | 6    |
| 907                       | 2N19096               | 2     | 35.7           | 77.6         | 34                | 78.4           | 1.8           | 1               | 14.1           | 6.14           | 42.8       | 122           | 52.7               | 302             | 22    | 8    |
| 908                       | 2N19098               | 2     | 39.9           | 82.5         | 38                | 79.4           | 1.9           | 1               | 13.5           | 5.53           | 41.6       | 108           | 55.9               | 389             | 20    | 9    |
| 909                       | 2N19099               | 2     | 40.1           | 87.3         | 36                | 79.6           | 1.8           | 1               | 13.2           | 5.62           | 43.5       | 110           | 63.1               | 401             | 36    | 1    |
| 910                       | 2N19100               | 2     | 42.3           | 87.1         | 39                | 78.9           | 1.8           | 1               | 12.8           | 5.38           | 42.4       | 93            | 53.4               | 394             | 31    | 3    |
| 911                       | 2N19101               | 2     | 39.3           | 86.7         | 34                | 79.7           | 1.7           | 1               | 13.0           | 5.54           | 42.8       | 100           | 54.8               | 402             | 35    | 2    |
| 912                       | 2N19105               | 2     | 40.0           | 87.5         | 42                | 78.3           | 3.1           | 1               | 15.1           | 7.92           | 52.3       | 140           | 70.1               | 201             | 14    | 16   |
| 913                       | 2N19106               | 2     | 40.8           | 87.1         | 40                | 78.7           | 2.5           | 1               | 14.5           | 6.79           | 47.2       | 134           | 69.2               | 277             | 20    | 9    |
| 914                       | 2N19110               | 2     | 38.4           | 82.9         | 33                | 78.9           | 1.9           | 1               | 14.1           | 5.73           | 40.0       | 132           | 59.9               | 325             | 20    | 9    |
| 915                       | 2N19111               | 2     | 36.7           | 85.7         | 43                | 80.3           | 2.3           | 1               | 14.8           | 6.57           | 44.7       | 143           | 56.9               | 336             | 17    | 13   |
| 916                       | 2N19113               | 2     | 36.8           | 84.2         | 44                | 79.0           | 1.9           | 1               | 14.4           | 6.21           | 44.1       | 179           | 56.9               | 412             | 11    | 18   |
| 900                       | HARRINGTON MALT CHECK | 2     | 36.3           | 88.8         | 61                | 80.3           | 2.0           | 1               | 12.1           | 5.62           | 48.6       | 83            | 51.8               | 437             | 29    |      |
| Minima                    |                       |       | 31.3           | 68.7         | 33                | 77.4           | 1.5           |                 | 12.8           | 5.23           | 40.0       | 93            | 52.7               | 168             | 7     |      |
| Maxima                    |                       |       | 42.3           | 91.2         | 44                | 80.4           | 3.1           |                 | 15.2           | 7.92           | 52.3       | 223           | 85.1               | 460             | 36    |      |
| Means                     |                       |       | 37.7           | 83.3         | 38                | 78.9           | 2.0           |                 | 14.0           | 6.13           | 44.0       | 136           | 63.7               | 331             | 21    |      |
| Standard Deviations       |                       |       | 2.7            | 5.3          | 3                 | 0.8            | 0.4           |                 | 0.8            | 0.68           | 3.1        | 32            | 8.0                | 79              | 8     |      |
| Coefficients of Variation |                       |       | 7.2            | 6.4          | 9                 | 1.1            | 20.0          |                 | 5.8            | 11.12          | 7.1        | 23            | 12.6               | 24              | 37    |      |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by J.D. Frankowiak and R.D. Horsley, North Dakota State University - Fargo

## 2000 EXPERIMENT LA46, LANGDON PRELIMINARY YIELD TRIAL - LANGDON, ND

Table 39

| Lab No.                   | Variety or Selection  | Rowed | Kernel Weight (mg) | on 6/64" | Barley Color (Agron) | Malt Extract (%) | Wort Color | Wort Clarity | Barley Protein (%) | Wort Protein (%) | S/T (%) | DP (°ASBC) | Alpha-amylase (20°DU) | Beta-glucan (ppm) | Quality Score | Overall Rank |
|---------------------------|-----------------------|-------|--------------------|----------|----------------------|------------------|------------|--------------|--------------------|------------------|---------|------------|-----------------------|-------------------|---------------|--------------|
| 917                       | STANDER               | 6     | 31.8               | 76.8     | 40                   | 79.6             | 2.8        | 1            | 13.4               | 7.20             | 54.0    | 173        | 77.3                  | 207               | 24            | 16           |
| 918                       | DRUMMOND              | 6     | 31.0               | 71.4     | 42                   | 78.2             | 2.1        | 1            | 14.5               | 6.69             | 46.6    | 221        | 67.5                  | 157               | 16            | 20           |
| 919                       | CONLON                | 2     | 36.3               | 81.2     | 39                   | 79.4             | 1.7        | 1            | 13.0               | 5.45             | 42.6    | 130        | 59.6                  | 291               | 26            | 11           |
| 920                       | ND16461-1             | 2     | 38.8               | 85.9     | 37                   | 79.2             | 1.7        | 1            | 12.6               | 5.34             | 44.4    | 95         | 60.1                  | 386               | 28            | 9            |
| 921                       | 2N19119               | 2     | 44.1               | 88.9     | 40                   | 81.1             | 2.4        | 1            | 12.4               | 6.63             | 54.3    | 103        | 66.5                  | 234               | 37            | 1            |
| 922                       | 2N19121               | 2     | 37.3               | 86.2     | 38                   | 80.0             | 1.7        | 1            | 12.3               | 6.13             | 49.0    | 116        | 64.0                  | 357               | 29            | 8            |
| 923                       | 2N19123               | 2     | 37.4               | 85.4     | 40                   | 78.7             | 1.9        | 1            | 14.4               | 5.71             | 40.6    | 147        | 56.7                  | 296               | 20            | 17           |
| 924                       | 2N19124               | 2     | 37.6               | 84.2     | 39                   | 78.7             | 2.0        | 1            | 14.8               | 6.28             | 43.6    | 148        | 62.2                  | 286               | 14            | 22           |
| 925                       | 2N19126               | 2     | 38.7               | 88.6     | 40                   | 78.3             | 1.7        | 1            | 12.9               | 5.21             | 40.1    | 126        | 55.5                  | 344               | 31            | 5            |
| 927                       | 2N19128               | 2     | 36.2               | 78.1     | 36                   | 78.6             | 1.7        | 1            | 13.2               | 5.67             | 44.1    | 110        | 57.1                  | 368               | 26            | 11           |
| 928                       | 2N19129               | 2     | 38.0               | 83.1     | 36                   | 77.0             | 1.8        | 1            | 14.5               | 5.40             | 37.6    | 150        | 52.9                  | 412               | 11            | 24           |
| 929                       | 2N19130               | 2     | 40.6               | 87.7     | 40                   | 78.8             | 1.6        | 1            | 12.5               | 4.75             | 38.4    | 121        | 50.5                  | 400               | 36            | 2            |
| 930                       | 2N19131               | 2     | 34.2               | 72.7     | 39                   | 77.1             | 1.4        | 1            | 13.8               | 5.27             | 38.2    | 139        | 45.1                  | 258               | 19            | 19           |
| 931                       | 2N19132               | 2     | 38.8               | 84.8     | 41                   | 77.4             | 1.5        | 1            | 14.8               | 5.88             | 41.2    | 161        | 54.7                  | 425               | 16            | 20           |
| 932                       | 2N19133               | 2     | 38.8               | 86.3     | 40                   | 78.7             | 1.8        | 1            | 13.5               | 5.78             | 43.4    | 132        | 63.2                  | 334               | 28            | 9            |
| 933                       | 2N19134               | 2     | 38.1               | 88.0     | 41                   | 79.6             | 1.4        | 1            | 13.5               | 5.14             | 39.3    | 108        | 54.9                  | 240               | 33            | 4            |
| 934                       | 2N19138               | 2     | 34.1               | 72.8     | 38                   | 79.8             | 1.4        | 1            | 13.5               | 5.43             | 40.2    | 117        | 53.7                  | 251               | 36            | 2            |
| 935                       | 2N19142               | 2     | 37.6               | 80.5     | 42                   | 78.2             | 1.8        | 1            | 12.9               | 5.63             | 44.0    | 130        | 65.6                  | 279               | 26            | 11           |
| 936                       | 2N19145               | 2     | 36.7               | 79.6     | 31                   | 78.5             | 1.9        | 1            | 13.8               | 5.15             | 37.9    | 130        | 55.1                  | 360               | 13            | 23           |
| 937                       | 2N19147               | 2     | 38.1               | 83.2     | 30                   | 78.6             | n.d.       | 3            | 13.7               | 5.24             | 38.5    | 150        | 55.7                  | 520               | 9             | 25           |
| 938                       | 2N19150               | 2     | 35.9               | 81.8     | 36                   | 77.4             | n.d.       | 3            | 12.6               | 4.88             | 39.0    | 127        | 46.0                  | 629               | 26            | 11           |
| 939                       | 2N19152               | 2     | 41.3               | 90.8     | 40                   | 79.0             | 2.5        | 1            | 14.7               | 6.27             | 44.4    | 126        | 53.7                  | 304               | 31            | 5            |
| 940                       | 2N19154               | 2     | 38.4               | 81.9     | 38                   | 79.6             | 1.7        | 1            | 14.6               | 5.99             | 41.7    | 195        | 54.2                  | 143               | 30            | 7            |
| 941                       | 2N19156               | 2     | 39.9               | 88.9     | 43                   | 79.5             | 1.7        | 1            | 12.6               | 5.90             | 47.4    | 134        | 63.6                  | 350               | 26            | 11           |
| 942                       | 2N19158               | 2     | 37.7               | 82.3     | 39                   | 77.5             | 1.8        | 1            | 14.3               | 5.96             | 41.3    | 118        | 55.4                  | 298               | 20            | 17           |
| 926                       | HARRINGTON MALT CHECK | 2     | 36.5               | 89.7     | 60                   | 80.5             | 1.9        | 1            | 11.8               | 5.77             | 50.1    | 96         | 58.1                  | 334               | 29            |              |
| Minima                    |                       |       | 31.0               | 71.4     | 30                   | 77.0             | 1.4        |              | 12.3               | 4.75             | 37.6    | 95         | 45.1                  | 143               | 9             |              |
| Maxima                    |                       |       | 44.1               | 90.8     | 43                   | 81.1             | 2.8        |              | 14.8               | 7.20             | 54.3    | 221        | 77.3                  | 629               | 37            |              |
| Means                     |                       |       | 37.5               | 82.8     | 39                   | 78.7             | 1.8        |              | 13.5               | 5.72             | 42.9    | 136        | 58.0                  | 325               | 24            |              |
| Standard Deviations       |                       |       | 2.8                | 5.3      | 3                    | 1.0              | 0.3        |              | 0.8                | 0.59             | 4.6     | 28         | 7.1                   | 106               | 8             |              |
| Coefficients of Variation |                       |       | 7.4                | 6.4      | 8                    | 1.3              | 19.1       |              | 6.2                | 10.32            | 10.7    | 21         | 12.2                  | 33                | 33            |              |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by J.D. Frankowiak and R.D. Horsley, North Dakota State University - Fargo

## 2000 EXPERIMENT LA47, PRELIMINARY YIELD TRIAL - LANGDON, ND

Table 40

| Lab No.                   | Variety or Selection  | Rowed | Kernel | on    | Barley | Malt    |      | Barley | Wort    |         | Alpha- | Beta- | Quality | Overall |    |    |
|---------------------------|-----------------------|-------|--------|-------|--------|---------|------|--------|---------|---------|--------|-------|---------|---------|----|----|
|                           |                       |       | Weight | 6/64" | Color  | Extract | Wort | Wort   | Protein | Protein | S/T    | DP    | amylase | glucan  |    |    |
| 943                       | STANDER               | 6     | 32.5   | 72.9  | 35     | 79.0    | 3.0  | 1      | 13.8    | 7.43    | 56.2   | 178   | 82.3    | 273     | 25 | 3  |
| 944                       | DRUMMOND              | 6     | 30.3   | 68.2  | 49     | 77.9    | 1.9  | 1      | 13.1    | 6.20    | 47.6   | 212   | 63.9    | 193     | 14 | 15 |
| 945                       | CONLON                | 2     | 34.3   | 79.2  | 40     | 78.4    | 1.5  | 1      | 13.5    | 5.58    | 43.0   | 156   | 59.3    | 283     | 22 | 8  |
| 946                       | ND16461-1             | 2     | 36.8   | 78.3  | 42     | 77.7    | 1.5  | 1      | 13.1    | 5.36    | 41.0   | 122   | 59.1    | 370     | 22 | 8  |
| 948                       | 2N19164               | 2     | 34.9   | 62.4  | 40     | 77.5    | 1.9  | 1      | 12.8    | 5.85    | 46.8   | 88    | 58.7    | 371     | 10 | 19 |
| 949                       | 2N19171               | 2     | 35.3   | 75.4  | 37     | 83.9    | 1.2  | 2      | 15.4    | 5.46    | 36.8   | 144   | 52.9    | 535     | 18 | 11 |
| 950                       | 2N19172               | 2     | 33.9   | 61.9  | 30     | 84.4    | 1.4  | 1      | 14.3    | 5.94    | 42.6   | 120   | 65.0    | 534     | 27 | 1  |
| 951                       | 2N19174               | 2     | 35.6   | 79.5  | *0     | 78.2    | 3.3  | 1      | 15.0    | 7.01    | 47.2   | 122   | 66.6    | 264     | 16 | 14 |
| 952                       | 2N19175               | 2     | 35.7   | 59.3  | 32     | 84.8    | 1.2  | 1      | 14.1    | 5.46    | 40.8   | 120   | 58.3    | 415     | 27 | 1  |
| 953                       | 2N19177               | 2     | 36.7   | 60.1  | 29     | 85.1    | 1.3  | 1      | 14.2    | 5.72    | 42.0   | 132   | 61.7    | 451     | 24 | 5  |
| 954                       | 2N19184               | 2     | 36.9   | 59.7  | 25     | 84.5    | 1.6  | 2      | 14.4    | 5.32    | 39.2   | 120   | 50.2    | 523     | 25 | 3  |
| 955                       | 2N19188               | 2     | 33.9   | 67.4  | 30     | 84.8    | 1.3  | 1      | 14.7    | 5.63    | 40.1   | 158   | 55.4    | 692     | 20 | 10 |
| 956                       | 2N19190               | 2     | 38.7   | 82.8  | 30     | 76.7    | 2.6  | 2      | 14.1    | 5.56    | 39.6   | 162   | 42.5    | 456     | 13 | 16 |
| 957                       | ND11993               | 2     | 34.3   | 73.7  | 38     | 77.1    | 1.5  | 1      | 13.6    | 5.48    | 40.3   | 153   | 48.8    | 461     | 17 | 12 |
| 958                       | ND13111               | 2     | 33.5   | 61.3  | 34     | 76.6    | 1.5  | 1      | 14.7    | 5.62    | 37.7   | 164   | 57.9    | 331     | 5  | 20 |
| 959                       | ND16092-2             | 2     | 37.1   | 81.8  | 39     | 81.1    | 2.6  | 1      | 13.1    | 7.10    | 53.4   | 139   | 81.2    | 265     | 24 | 5  |
| 960                       | ND16461-8             | 2     | 36.6   | 78.4  | 32     | 77.3    | 1.7  | 1      | 13.5    | 5.31    | 39.9   | 117   | 59.2    | 432     | 17 | 12 |
| 961                       | ND16461-11            | 2     | 38.4   | 82.2  | 40     | 78.3    | 2.6  | 2      | 12.8    | 5.21    | 40.7   | 104   | 56.1    | 398     | 24 | 5  |
| 962                       | PFC210                | 2     | 36.3   | 75.6  | 45     | 75.9    | 3.2  | 1      | 15.8    | 5.84    | 37.3   | 136   | 56.7    | 271     | 12 | 18 |
| 963                       | CLE182                | 2     | 35.7   | 70.6  | 32     | 73.8    | 2.5  | 1      | 16.5    | 6.07    | 36.9   | 101   | 47.9    | 356     | 13 | 16 |
| 947                       | HARRINGTON MALT CHECK | 2     | 36.1   | 88.0  | 62     | 80.2    | 1.9  | 2      | 12.2    | 5.72    | 48.6   | 101   | 53.8    | 348     | 32 |    |
| Minima                    |                       |       | 30.3   | 59.3  | 25     | 73.8    | 1.2  |        | 12.8    | 5.21    | 36.8   | 88    | 42.5    | 193     | 5  |    |
| Maxima                    |                       |       | 38.7   | 82.8  | 49     | 85.1    | 3.3  |        | 16.5    | 7.43    | 56.2   | 212   | 82.3    | 692     | 27 |    |
| Means                     |                       |       | 35.4   | 71.5  | 36     | 79.7    | 2.0  |        | 14.1    | 5.86    | 42.5   | 137   | 59.2    | 394     | 19 |    |
| Standard Deviations       |                       |       | 2.0    | 8.4   | 6      | 3.6     | 0.7  |        | 1.0     | 0.63    | 5.3    | 29    | 9.7     | 122     | 6  |    |
| Coefficients of Variation |                       |       | 5.7    | 11.7  | 17     | 4.5     | 35.7 |        | 7.2     | 10.74   | 12.5   | 21    | 16.5    | 31      | 33 |    |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by J.D. Frankowiak and R.D. Horsley, North Dakota State University - Fargo

## 2000 EXPERIMENT 3, INTERMEDIATE YIELD TRIAL - CARRINGTON, ND

Table 41

| Lab No. | Variety or Selection | Rowed | Kernel         | on           | Barley            | Malt           | Barley        | Wort            | Alpha-         | Beta-          | Quality | Overall |      |     |    |    |
|---------|----------------------|-------|----------------|--------------|-------------------|----------------|---------------|-----------------|----------------|----------------|---------|---------|------|-----|----|----|
|         |                      |       | Weight<br>(mg) | 6/64"<br>(%) | Color<br>(Agtron) | Extract<br>(%) | Wort<br>Color | Wort<br>Clarity | Protein<br>(%) | Protein<br>(%) |         |         |      |     |    |    |
| 1440    | MOREX                | 6     | 27.7           | 36.9         | 40                | 75.4           | 2.3           | 1               | 15.5           | 6.61           | 44.8    | 200     | 68.7 | 214 | 10 | 51 |
| 1441    | ROBUST               | 6     | 30.2           | 49.6         | 39                | 76.6           | 1.9           | 1               | 14.9           | 6.37           | 43.2    | 211     | 54.8 | 350 | 18 | 22 |
| 1442    | STANDER              | 6     | 29.9           | 57.2         | 38                | 78.2           | 2.4           | 1               | 14.6           | 6.71           | 45.6    | 171     | 80.2 | 283 | 16 | 33 |
| 1443    | FOSTER               | 6     | 30.9           | 58.1         | 33                | 76.6           | 2.2           | 1               | 13.9           | 6.18           | 46.3    | 181     | 64.3 | 360 | 11 | 49 |
| 1444    | DRUMMOND             | 6     | 30.2           | 58.9         | 44                | 77.6           | 2.0           | 1               | 14.3           | 6.15           | 43.0    | 217     | 66.9 | 203 | 14 | 37 |
| 1445    | ND 17641             | 6     | 30.4           | 55.3         | 40                | 77.7           | 2.3           | 1               | 14.0           | 6.59           | 48.3    | 193     | 69.1 | 197 | 14 | 37 |
| 1446    | ND 17643             | 6     | 32.0           | 70.3         | 40                | 77.9           | 2.2           | 1               | 14.5           | 6.42           | 46.0    | 190     | 68.6 | 211 | 18 | 22 |
| 1447    | ND 17655             | 6     | 33.1           | 69.3         | 41                | 78.8           | 2.3           | 1               | 14.2           | 6.58           | 46.2    | 195     | 70.0 | 166 | 14 | 37 |
| 1448    | ND 17658             | 6     | 31.1           | 69.4         | 40                | 78.3           | 2.3           | 1               | 14.0           | 6.50           | 48.9    | 186     | 70.2 | 289 | 18 | 22 |
| 1449    | ND 17661             | 6     | 29.5           | 59.8         | 43                | 77.5           | 2.0           | 1               | 14.3           | 6.29           | 43.9    | 201     | 73.0 | 255 | 12 | 43 |
| 1450    | ND 17664             | 6     | 29.1           | 62.2         | 39                | 77.7           | 2.1           | 1               | 14.5           | 6.66           | 46.8    | 182     | 68.8 | 132 | 11 | 49 |
| 1451    | ND 17687             | 6     | 30.2           | 62.3         | 38                | 77.4           | 2.3           | 1               | 14.4           | 6.34           | 45.6    | 193     | 67.8 | 216 | 14 | 37 |
| 1452    | ND 17711             | 6     | 28.6           | 52.2         | 41                | 77.8           | 2.4           | 1               | 13.9           | 6.62           | 48.8    | 192     | 69.1 | 190 | 12 | 43 |
| 1453    | ND 17715             | 6     | 29.8           | 61.7         | 36                | 77.3           | 2.3           | 1               | 14.1           | 6.41           | 46.8    | 192     | 71.3 | 179 | 7  | 54 |
| 1454    | ND 17788             | 6     | 31.8           | 70.0         | 44                | 77.5           | 2.2           | 1               | 14.0           | 6.26           | 47.0    | 176     | 64.1 | 261 | 17 | 27 |
| 1455    | ND 17789             | 6     | 32.1           | 75.1         | 34                | 77.2           | 2.1           | 1               | 14.3           | 6.47           | 46.1    | 199     | 61.4 | 262 | 13 | 42 |
| 1456    | ND 17871             | 6     | 28.7           | 59.0         | 40                | 76.6           | 2.2           | 1               | 14.6           | 6.42           | 44.9    | 224     | 71.2 | 247 | 12 | 43 |
| 1457    | ND 18032             | 6     | 30.2           | 55.8         | 49                | 77.3           | 2.1           | 1               | 14.6           | 6.41           | 45.0    | 231     | 66.7 | 162 | 14 | 37 |
| 1458    | MOREX                | 6     | 27.8           | 34.3         | 45                | 75.8           | 2.0           | 1               | 13.9           | 6.01           | 44.5    | 178     | 75.5 | 128 | 19 | 19 |
| 1459    | ROBUST               | 6     | 28.2           | 37.3         | 50                | 76.6           | 1.9           | 1               | 14.2           | 6.10           | 44.2    | 195     | 60.4 | 174 | 12 | 43 |
| 1460    | STANDER              | 6     | 29.2           | 48.9         | 49                | 77.2           | 2.5           | 1               | 13.9           | 6.65           | 50.6    | 167     | 80.3 | 173 | 16 | 33 |
| 1461    | FOSTER               | 6     | 29.5           | 56.2         | 45                | 76.4           | 2.1           | 1               | 13.0           | 5.83           | 46.1    | 169     | 69.2 | 233 | 19 | 19 |
| 1462    | DRUMMOND             | 6     | 28.5           | 42.3         | 52                | 76.9           | 1.7           | 1               | 13.5           | 5.67           | 42.9    | 203     | 71.7 | 137 | 24 | 5  |
| 1464    | ND 17641             | 6     | 30.7           | 60.2         | 42                | 77.8           | 2.2           | 1               | 12.5           | 6.22           | 48.9    | 164     | 76.6 | 163 | 18 | 22 |
| 1465    | ND 17643             | 6     | 31.5           | 70.8         | 45                | 77.7           | 2.0           | 1               | 13.9           | 6.12           | 46.3    | 179     | 72.9 | 208 | 17 | 27 |
| 1466    | ND 17655             | 6     | 30.4           | 52.3         | 41                | 77.4           | 2.1           | 1               | 12.2           | 5.93           | 49.1    | 175     | 78.3 | 108 | 26 | 1  |
| 1467    | ND 17658             | 6     | 30.7           | 69.1         | 45                | 78.0           | 2.3           | 1               | 12.4           | 6.05           | 51.3    | 164     | 72.8 | 323 | 20 | 15 |
| 1468    | ND 17661             | 6     | 29.8           | 62.8         | 49                | 77.8           | 1.8           | 1               | 12.9           | 5.78           | 44.7    | 182     | 73.6 | 189 | 20 | 15 |
| 1469    | ND 17664             | 6     | 30.3           | 69.9         | 47                | 77.7           | 1.9           | 1               | 13.6           | 6.23           | 46.6    | 162     | 72.8 | 144 | 22 | 9  |
| 1470    | ND 17687             | 6     | 29.6           | 66.2         | 46                | 77.7           | 2.0           | 1               | 13.1           | 6.19           | 47.9    | 180     | 74.7 | 186 | 12 | 43 |

Table 41

| Lab No.                   | Variety or Selection | Rowed | Kernel Weight (mg) | on 6/64" | Barley Color (Agtron) | Malt Extract (%) | Wort Color | Wort Clarity | Barley Protein (%) | Wort Protein (%) | S/T (%) | DP (°ASBC) | Alpha-amylase (20°DU) | Beta-glucan (ppm) | Quality Score | Overall Rank |
|---------------------------|----------------------|-------|--------------------|----------|-----------------------|------------------|------------|--------------|--------------------|------------------|---------|------------|-----------------------|-------------------|---------------|--------------|
| 1471                      | ND 17711             | 6     | 28.3               | 55.9     | 45                    | 77.6             | 2.0        | 1            | 13.1               | 6.19             | 48.6    | 173        | 69.8                  | 195               | 12            | 43           |
| 1472                      | ND 17715             | 6     | 28.8               | 62.7     | 50                    | 78.0             | 1.9        | 1            | 13.4               | 6.22             | 48.8    | 167        | 76.0                  | 211               | 20            | 15           |
| 1473                      | ND 17788             | 6     | 29.3               | 56.3     | 49                    | 77.4             | 2.0        | 1            | 12.8               | 5.88             | 46.7    | 153        | 63.1                  | 259               | 22            | 9            |
| 1474                      | ND 17789             | 6     | 29.8               | 59.9     | 46                    | 76.8             | 2.0        | 1            | 13.3               | 5.81             | 45.3    | 169        | 67.6                  | 300               | 24            | 5            |
| 1475                      | ND 17871             | 6     | 29.5               | 66.3     | 48                    | 77.3             | 2.0        | 1            | 13.3               | 5.88             | 46.7    | 180        | 70.1                  | 207               | 15            | 35           |
| 1476                      | ND 18032             | 6     | 30.1               | 61.7     | 56                    | 77.8             | 1.9        | 1            | 12.8               | 5.99             | 48.7    | 193        | 68.9                  | 191               | 17            | 27           |
| 1477                      | MOREX                | 6     | 28.0               | 43.2     | 45                    | 75.5             | 1.8        | 1            | 14.8               | 6.01             | 40.6    | 189        | 65.2                  | 225               | 10            | 51           |
| 1478                      | ROBUST               | 6     | 31.3               | 62.3     | 46                    | 76.7             | 1.6        | 1            | 14.6               | 5.44             | 39.2    | 170        | *51.6                 | 355               | 20            | 15           |
| 1479                      | STANDER              | 6     | 30.9               | 64.9     | 45                    | 78.6             | 2.0        | 1            | 13.5               | 6.31             | 48.6    | 153        | 74.7                  | 285               | 25            | 4            |
| 1480                      | FOSTER               | 6     | 31.4               | 63.7     | 44                    | 77.0             | 1.7        | 1            | 13.4               | 5.65             | 43.4    | 169        | 63.6                  | 333               | 23            | 7            |
| 1481                      | DRUMMOND             | 6     | 29.6               | 56.8     | 47                    | 76.5             | 1.6        | 1            | 14.6               | 5.46             | 38.5    | 204        | 63.1                  | 220               | 10            | 51           |
| 1482                      | ND 17641             | 6     | 31.9               | 67.5     | 48                    | 77.3             | 1.9        | 1            | 13.9               | 6.14             | 46.3    | 181        | 72.9                  | 150               | 18            | 22           |
| 1483                      | ND 17643             | 6     | 31.3               | 73.6     | 45                    | 77.8             | 2.0        | 1            | 14.8               | 6.21             | 44.5    | 178        | 71.4                  | 187               | 17            | 27           |
| 1485                      | ND 17655             | 6     | 32.1               | 65.0     | 45                    | 77.7             | 2.0        | 1            | 13.7               | 5.84             | 43.8    | 171        | 68.8                  | 158               | 23            | 7            |
| 1486                      | ND 17658             | 6     | 30.5               | 70.8     | 47                    | 77.8             | 1.9        | 1            | 13.7               | 5.82             | 44.3    | 168        | 66.0                  | 308               | 26            | 1            |
| 1487                      | ND 17661             | 6     | 29.6               | 66.9     | 45                    | 77.8             | 2.0        | 1            | 14.5               | 5.98             | 42.3    | 177        | 68.2                  | 226               | 15            | 35           |
| 1488                      | ND 17664             | 6     | 30.5               | 75.2     | 45                    | 77.1             | 1.8        | 1            | 14.3               | 6.14             | 42.9    | 161        | 64.5                  | 204               | 21            | 12           |
| 1489                      | ND 17687             | 6     | 30.7               | 67.4     | 47                    | 78.0             | 1.8        | 1            | 14.2               | 5.89             | 43.5    | 186        | 68.6                  | 232               | 17            | 27           |
| 1490                      | ND 17711             | 6     | 29.3               | 62.2     | 44                    | 78.0             | 1.9        | 1            | 13.4               | 6.04             | 45.7    | 192        | 69.1                  | 209               | 17            | 27           |
| 1491                      | ND 17715             | 6     | 30.6               | 66.0     | 45                    | 77.7             | 1.8        | 1            | 13.8               | 5.96             | 45.1    | 192        | 73.2                  | 192               | 22            | 9            |
| 1492                      | ND 17788             | 6     | 30.7               | 67.7     | 46                    | 77.5             | 1.8        | 1            | 13.8               | 5.68             | 42.7    | 180        | 65.4                  | 308               | 19            | 19           |
| 1493                      | ND 17789             | 6     | 31.4               | 74.5     | 44                    | 77.0             | 1.7        | 1            | 14.5               | 5.86             | 42.3    | 193        | 59.4                  | 366               | 21            | 12           |
| 1494                      | ND 17871             | 6     | 30.2               | 68.7     | 48                    | 78.1             | 1.7        | 1            | 13.5               | 5.79             | 45.5    | 196        | 70.6                  | 279               | 26            | 1            |
| 1495                      | ND 18032             | 6     | 31.1               | 67.0     | 53                    | 78.6             | 1.9        | 1            | 14.1               | 5.85             | 43.5    | 220        | 68.5                  | 153               | 21            | 12           |
| 1463                      | MOREX MALT CHECK     | 6     | 31.7               | 74.5     | 73                    | 79.3             | 1.6        | 1            | 12.2               | 5.57             | 46.4    | 153        | 78.6                  | 91                | 43            |              |
| 1484                      | MOREX MALT CHECK     | 6     | 31.8               | 74.6     | 69                    | 79.1             | 1.7        | 1            | 11.9               | 5.73             | 50.7    | 144        | 70.3                  | 92                | 43            |              |
| Minima                    |                      |       | 27.7               | 34.3     | 33                    | 75.4             | 1.6        |              | 12.2               | 5.44             | 38.5    | 153        | 54.8                  | 108               | 7             |              |
| Maxima                    |                      |       | 33.1               | 75.2     | 56                    | 78.8             | 2.5        |              | 15.5               | 6.71             | 51.3    | 231        | 80.3                  | 366               | 26            |              |
| Means                     |                      |       | 30.2               | 61.1     | 44                    | 77.4             | 2.0        |              | 13.9               | 6.13             | 45.5    | 185        | 69.3                  | 224               | 17            |              |
| Standard Deviations       |                      |       | 1.2                | 9.6      | 5                     | 0.7              | 0.2        |              | 0.7                | 0.32             | 2.6     | 17         | 5.1                   | 65                | 5             |              |
| Coefficients of Variation |                      |       | 4.0                | 15.8     | 10                    | 0.9              | 10.5       |              | 4.9                | 5.15             | 5.8     | 9          | 7.3                   | 29                | 27            |              |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by R.D. Horsley and J.D. Franckowiak, North Dakota State University - Fargo

## 2000 EXPERIMENT 2, ADVANCED YIELD TRIAL - CARRINGTON, ND

Table 42

| Lab No. | Variety or Selection | Rowed    | Kernel | on    | Barley  | Malt    |      | Barley | Wort    |         | Alpha- | Beta-   |         |        |         |         |
|---------|----------------------|----------|--------|-------|---------|---------|------|--------|---------|---------|--------|---------|---------|--------|---------|---------|
|         |                      |          | Weight | 6/64" | Color   | Extract | Wort | Wort   | Protein | Protein | S/T    | DP      | amylase | glucan | Quality | Overall |
| (mg)    | (%)                  | (Agtron) | (%)    | Color | Clarity | (%)     | (%)  | (%)    | (%)     | (%)     | (%)    | (°ASBC) | (20°DU) | (ppm)  | Score   | Rank    |
| 1496    | MOREX                | 6        | 30.2   | 54.2  | 33      | 77.5    | 2.4  | 1      | 14.4    | 6.41    | 45.7   | 221     | 72.9    | 238    | 14      | 24      |
| 1497    | ROBUST               | 6        | 30.7   | 46.7  | 37      | 77.2    | 2.0  | 1      | 15.0    | 6.45    | 43.4   | 220     | 63.0    | 307    | 11      | 30      |
| 1498    | STANDER              | 6        | 29.9   | 59.3  | 36      | 79.0    | 2.7  | 1      | 14.1    | 7.01    | 49.9   | 182     | 88.9    | 192    | 14      | 24      |
| 1499    | FOSTER               | 6        | 30.7   | 64.1  | 33      | 77.7    | 2.3  | 1      | 13.3    | 6.21    | 49.5   | 179     | 75.3    | 269    | 14      | 24      |
| 1500    | DRUMMOND             | 6        | 29.8   | 60.1  | 40      | 78.0    | 2.3  | 1      | 14.7    | 6.50    | 45.0   | 206     | 77.2    | 162    | 16      | 21      |
| 1501    | ND 16903             | 6        | 30.6   | 69.4  | 35      | 78.0    | 2.3  | 1      | 14.7    | 6.65    | 46.9   | 195     | 78.4    | 420    | 10      | 32      |
| 1502    | ND 16922             | 6        | 30.5   | 66.9  | 38      | 77.4    | 2.4  | 1      | 15.0    | 6.59    | 46.0   | 187     | 87.0    | 302    | 6       | 36      |
| 1503    | ND 17008             | 6        | 32.4   | 75.9  | 38      | 76.9    | 2.5  | 1      | 15.3    | 6.58    | 44.7   | 199     | 69.6    | 270    | 18      | 15      |
| 1505    | ND 17079             | 6        | 31.6   | 66.8  | 34      | 77.3    | 2.3  | 1      | 15.5    | 6.64    | 44.9   | 203     | 70.5    | 366    | 11      | 30      |
| 1506    | ND 17082             | 6        | 30.0   | 59.5  | 33      | 77.7    | 2.5  | 1      | 14.1    | 6.27    | 46.1   | 185     | 71.2    | 312    | 6       | 36      |
| 1507    | ND 17108             | 6        | 27.6   | 41.0  | 39      | 77.0    | 2.2  | 1      | 14.3    | 6.42    | 46.6   | 185     | 77.3    | 180    | 5       | 39      |
| 1508    | ND 17134             | 6        | 28.9   | 52.6  | 35      | 79.1    | 2.4  | 1      | 15.5    | 6.71    | 45.5   | 215     | 75.0    | 151    | 19      | 13      |
| 1509    | ND 17245             | 6        | 29.0   | 68.2  | 34      | 76.9    | 2.2  | 1      | 15.4    | 6.65    | 45.0   | 190     | 69.2    | 280    | 12      | 29      |
| 1510    | MOREX                | 6        | 26.3   | 30.0  | 47      | 75.7    | 2.1  | 1      | 13.4    | 6.09    | 46.7   | 166     | 83.0    | 118    | 18      | 15      |
| 1511    | ROBUST               | 6        | 27.9   | 39.9  | 47      | 76.8    | 1.9  | 1      | 14.0    | 6.00    | 43.8   | 174     | 60.4    | 208    | 10      | 32      |
| 1512    | STANDER              | 6        | 27.6   | 45.8  | 45      | 78.4    | 2.5  | 1      | 13.5    | 6.68    | 51.7   | 151     | 89.8    | 164    | 21      | 11      |
| 1513    | FOSTER               | 6        | 29.4   | 50.5  | 41      | 76.2    | 2.1  | 1      | 13.0    | 5.89    | 45.8   | 158     | 76.7    | 238    | 27      | 4       |
| 1514    | DRUMMOND             | 6        | 27.6   | 44.7  | 55      | 77.3    | 1.8  | 1      | 13.4    | 5.46    | 42.2   | 190     | 75.8    | 171    | 18      | 15      |
| 1515    | ND 16903             | 6        | 27.7   | 53.9  | 46      | 76.9    | 2.1  | 1      | 13.3    | 6.30    | 47.8   | 172     | 83.6    | 342    | 7       | 35      |
| 1516    | ND 16922             | 6        | 27.4   | 48.7  | 47      | 77.0    | 2.3  | 1      | 14.0    | 6.39    | 48.0   | 174     | 88.9    | 260    | 10      | 32      |
| 1517    | ND 17008             | 6        | 29.4   | 60.9  | 52      | 77.1    | 2.0  | 1      | 13.7    | 5.87    | 43.8   | 156     | 76.5    | 317    | 24      | 8       |
| 1518    | ND 17079             | 6        | 31.3   | 64.7  | 45      | 77.7    | 2.0  | 1      | 13.7    | 6.03    | 45.2   | 169     | 73.9    | 299    | 23      | 10      |
| 1519    | ND 17082             | 6        | 28.1   | 50.9  | 47      | 76.4    | 2.1  | 1      | 13.1    | 5.84    | 45.3   | 175     | 73.4    | 278    | 20      | 12      |
| 1520    | ND 17108             | 6        | 28.3   | 50.8  | 44      | 77.4    | 2.1  | 1      | 12.8    | 5.77    | 45.2   | 184     | 78.2    | 145    | 24      | 8       |
| 1521    | ND 17134             | 6        | 27.6   | 48.9  | 44      | 80.0    | 2.0  | 1      | 13.8    | 5.97    | 45.3   | 181     | 78.3    | 94     | 29      | 3       |
| 1522    | ND 17245             | 6        | 26.7   | 52.8  | 43      | 76.2    | 1.9  | 1      | 13.8    | 5.86    | 45.1   | 146     | 71.0    | 254    | 25      | 7       |
| 1523    | MOREX                | 6        | 28.2   | 44.8  | 46      | 76.3    | 1.7  | 1      | 14.4    | 5.45    | 39.2   | 170     | 71.1    | 249    | 14      | 24      |
| 1524    | ROBUST               | 6        | 29.0   | 49.1  | 50      | 76.7    | 1.5  | 1      | 14.3    | 5.49    | 38.4   | 164     | 54.6    | 356    | 18      | 15      |
| 1526    | STANDER              | 6        | 30.4   | 62.4  | 53      | 79.3    | 1.9  | 1      | 13.2    | 5.89    | 47.2   | 149     | 81.9    | 267    | 31      | 2       |
| 1527    | FOSTER               | 6        | 30.9   | 65.6  | 47      | 77.3    | 1.8  | 1      | 13.1    | 5.37    | 42.5   | 151     | 66.3    | 318    | 26      | 5       |

Table 42

| Lab No.                   | Variety or Selection | Rowed | Kernel | on    | Barley | Malt    | Barley | Wort | S/T     | Alpha-  | Beta- | Overall |      |     |    |    |
|---------------------------|----------------------|-------|--------|-------|--------|---------|--------|------|---------|---------|-------|---------|------|-----|----|----|
|                           |                      |       | Weight | 6/64" | Color  | Extract | Wort   | Wort | Protein | Protein | DP    | amylase |      |     |    |    |
| 1528                      | DRUMMOND             | 6     | 29.7   | 57.7  | 49     | 77.5    | 1.6    | 1    | 13.9    | 5.35    | 39.7  | 188     | 66.7 | 255 | 15 | 23 |
| 1529                      | ND 16903             | 6     | 30.4   | 71.8  | 48     | 78.2    | 1.8    | 1    | 13.3    | 5.84    | 43.8  | 154     | 75.8 | 399 | 33 | 1  |
| 1530                      | ND 16922             | 6     | 30.1   | 66.3  | 50     | 78.0    | 1.8    | 1    | 14.1    | 5.84    | 42.1  | 170     | 81.4 | 335 | 18 | 15 |
| 1531                      | ND 17008             | 6     | 29.9   | 64.4  | 51     | 76.9    | 1.9    | 2    | 14.7    | 5.41    | 37.1  | 181     | 60.0 | 311 | 6  | 36 |
| 1532                      | ND 17079             | 6     | 32.5   | 76.6  | 41     | 77.7    | 1.8    | 1    | 14.2    | 5.97    | 42.0  | 181     | 60.6 | 419 | 18 | 15 |
| 1533                      | ND 17082             | 6     | 30.6   | 64.3  | 43     | 77.6    | 2.5    | 2    | 14.1    | 5.37    | 39.3  | 166     | 58.8 | 444 | 16 | 21 |
| 1534                      | ND 17108             | 6     | 30.2   | 60.8  | 42     | 77.3    | 2.1    | 2    | 14.1    | 5.53    | 40.9  | 191     | 61.8 | 300 | 13 | 28 |
| 1535                      | ND 17134             | 6     | 29.3   | 61.4  | 39     | 79.9    | 2.3    | 2    | 13.9    | 5.72    | 42.1  | 192     | 64.4 | 237 | 26 | 5  |
| 1536                      | ND 17245             | 6     | 29.6   | 70.6  | 43     | 77.7    | 1.7    | 1    | 14.2    | 5.84    | 43.2  | 162     | 61.4 | 332 | 19 | 13 |
| 1504                      | MOREX MALT CHECK     | 6     | 32.1   | 73.8  | 69     | 79.8    | 1.7    | 1    | 12.5    | 5.64    | 47.2  | 139     | 66.3 | 107 | 41 |    |
| 1525                      | MOREX MALT CHECK     | 6     | 31.4   | 74.1  | 70     | 79.5    | 1.6    | 1    | 12.0    | 5.61    | 47.4  | 137     | 75.6 | 124 | 40 |    |
| Minima                    |                      |       | 26.3   | 30.0  | 33     | 75.7    | 1.5    |      | 12.8    | 5.35    | 37.1  | 146     | 54.6 | 94  | 5  |    |
| Maxima                    |                      |       | 32.5   | 76.6  | 55     | 80.0    | 2.7    |      | 15.5    | 7.01    | 51.7  | 221     | 89.8 | 444 | 33 |    |
| Means                     |                      |       | 29.4   | 57.5  | 43     | 77.5    | 2.1    |      | 14.1    | 6.06    | 44.4  | 179     | 73.1 | 271 | 17 |    |
| Standard Deviations       |                      |       | 1.5    | 10.6  | 6      | 1.0     | 0.3    |      | 0.7     | 0.45    | 3.1   | 19      | 9.0  | 85  | 7  |    |
| Coefficients of Variation |                      |       | 5.1    | 18.4  | 14     | 1.2     | 13.6   |      | 5.1     | 7.51    | 7.1   | 11      | 12.4 | 31  | 43 |    |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by R.D. Horsley and J.D. Franckowiak, North Dakota State University - Fargo

## 2000 EXPERIMENT 1, VARIETAL YIELD TRIAL - CARRINGTON, ND

Table 43

| Lab No. | Variety or Selection | Rowed | Kernel         | on    | Barley            | Malt           | Barley        | Wort            | Alpha-         | Beta-          | Quality        | Overall       |                 |       |      |    |
|---------|----------------------|-------|----------------|-------|-------------------|----------------|---------------|-----------------|----------------|----------------|----------------|---------------|-----------------|-------|------|----|
|         |                      |       | Weight<br>(mg) | 6/64" | Color<br>(Agtron) | Extract<br>(%) | Wort<br>Color | Wort<br>Clarity | Protein<br>(%) | Protein<br>(%) | S/T<br>(°ASBC) | DP<br>(20°DU) | glucan<br>(ppm) | Score | Rank |    |
| 1537    | MOREX                | 6     | 27.3           | 36.4  | 39                | 75.9           | 2.2           | 1               | 15.5           | 6.48           | 42.4           | 196           | 71.8            | 244   | 10   | 49 |
| 1538    | ROBUST               | 6     | 29.5           | 51.7  | 43                | 76.7           | 2.0           | 1               | 15.1           | 5.94           | 40.7           | 186           | 53.5            | 371   | 19   | 25 |
| 1539    | EXCEL                | 6     | 29.3           | 43.0  | 38                | 77.1           | 2.5           | 1               | 13.8           | 6.63           | 47.5           | 168           | 74.6            | 376   | 13   | 42 |
| 1540    | STANDER              | 6     | 30.2           | 60.5  | 38                | 78.8           | 2.6           | 1               | 13.7           | 6.60           | 48.1           | 167           | 77.0            | 337   | 19   | 25 |
| 1541    | MNBRITE              | 6     | 29.9           | 53.6  | 43                | 76.6           | 2.3           | 1               | 16.3           | 7.00           | 44.5           | 244           | 75.1            | 285   | 12   | 45 |
| 1542    | LACEY                | 6     | 30.8           | 58.9  | 39                | 77.7           | 2.1           | 1               | 13.7           | 6.10           | 44.7           | 184           | 78.4            | 266   | 19   | 25 |
| 1543    | AZURE                | 6     | 31.4           | 68.5  | 33                | 75.9           | 2.0           | 1               | 14.5           | 5.91           | 42.3           | 170           | 55.7            | 463   | 22   | 18 |
| 1544    | FOSTER               | 6     | 31.1           | 63.1  | 34                | 77.1           | 2.2           | 1               | 13.4           | 5.98           | 45.6           | 169           | 64.8            | 363   | 23   | 14 |
| 1545    | DRUMMOND<br>B2978    | 6     | 30.1           | 63.1  | 41                | 78.6           | 2.1           | 1               | 14.4           | 6.16           | 44.5           | 198           | 67.1            | 248   | 18   | 31 |
| 1547    |                      | 6     | 29.3           | 47.3  | 42                | 78.3           | 2.3           | 1               | 13.9           | 6.46           | 48.8           | 178           | 79.0            | 409   | 13   | 42 |
| 1548    | CONLON               | 6     | 34.6           | 72.5  | 33                | 77.9           | 1.8           | 1               | 14.6           | 5.36           | 38.2           | 129           | 67.5            | 330   | 13   | 42 |
| 1549    | ND15422              | 6     | 31.2           | 61.1  | 38                | 78.2           | 2.2           | 1               | 14.5           | 6.28           | 45.5           | 197           | 68.4            | 276   | 18   | 31 |
| 1550    | ND16301              | 6     | 29.5           | 58.5  | 37                | 78.2           | 2.2           | 1               | 14.2           | 6.29           | 45.5           | 203           | 72.6            | 222   | 16   | 36 |
| 1551    | ND16318              | 6     | 31.0           | 72.6  | 31                | 77.8           | *4.0          | 1               | 14.2           | 6.55           | 48.5           | 168           | 62.4            | 283   | 16   | 36 |
| 1552    | 6B94-8253            | 6     | 30.9           | 66.3  | 35                | 76.5           | 3.7           | 1               | 14.3           | 6.18           | 44.5           | 188           | 67.2            | 181   | 14   | 41 |
| 1553    | 6B95-2482            | 6     | 29.7           | 59.0  | 41                | 77.9           | 3.5           | 1               | 13.7           | 5.85           | 43.8           | 192           | 60.8            | 198   | 20   | 24 |
| 1554    | M104                 | 6     | 28.8           | 48.5  | 32                | 78.0           | *3.9          | 1               | 14.0           | 6.75           | 47.6           | 173           | 72.4            | 263   | 7    | 50 |
| 1555    | MOREX                | 6     | 27.5           | 36.6  | 45                | 77.0           | 2.1           | 1               | 12.9           | 6.09           | 50.1           | 151           | 76.4            | 121   | 21   | 22 |
| 1556    | ROBUST               | 6     | 28.3           | 37.5  | 48                | 77.7           | 1.8           | 1               | 13.3           | 5.91           | 46.9           | 167           | 58.2            | 224   | 23   | 14 |
| 1557    | EXCEL                | 6     | 26.8           | 25.4  | 50                | 77.8           | 2.4           | 1               | 12.4           | 6.43           | 55.1           | 135           | 75.5            | 231   | 19   | 25 |
| 1558    | STANDER              | 6     | 28.1           | 48.1  | 49                | 78.3           | 2.4           | 1               | 13.2           | 6.61           | 53.4           | 151           | 82.3            | 243   | 23   | 14 |
| 1559    | MNBRITE              | 6     | 27.5           | 42.2  | 52                | 77.0           | 2.0           | 1               | 14.0           | 6.56           | 48.6           | 178           | 74.5            | 176   | 5    | 51 |
| 1560    | LACEY                | 6     | 28.5           | 41.2  | 48                | 77.7           | 2.0           | 1               | 12.7           | 6.01           | 49.1           | 159           | 67.6            | 142   | 23   | 14 |
| 1561    | AZURE                | 6     | 29.4           | 53.9  | 44                | 77.2           | 1.9           | 1               | 12.2           | 5.38           | 46.8           | 134           | 58.8            | 359   | 25   | 9  |
| 1562    | FOSTER               | 6     | 28.8           | 54.1  | 44                | 76.8           | 2.0           | 1               | 12.2           | 5.73           | 48.4           | 145           | 67.0            | 304   | 24   | 12 |
| 1563    | DRUMMOND<br>B2978    | 6     | 27.6           | 44.6  | 54                | 77.4           | 1.8           | 1               | 12.6           | 5.54           | 46.2           | 167           | 65.5            | 188   | 17   | 35 |
| 1564    |                      | 6     | 25.1           | 24.8  | 59                | 77.7           | 2.0           | 1               | 12.0           | 6.19           | 53.6           | 149           | 81.6            | 288   | 22   | 18 |
| 1565    | CONLON               | 6     | 34.4           | 76.5  | 47                | 78.8           | 1.6           | 1               | 12.7           | 5.18           | 41.5           | 113           | 72.0            | 239   | 34   | 1  |
| 1566    | ND15422              | 6     | 29.6           | 49.6  | 53                | 78.0           | 1.9           | 1               | 12.3           | 5.91           | 49.8           | 163           | 70.4            | 229   | 24   | 12 |
| 1568    | ND16301              | 6     | 30.6           | 66.4  | 47                | 79.0           | 2.1           | 1               | 11.7           | 5.92           | 50.5           | 171           | 70.1            | 150   | 33   | 2  |

Table 43

| Lab No.                   | Variety or Selection | Rowed | Kernel         | on           | Barley            | Malt           | Barley        | Wort            | Wort           | Alpha-         | Beta-      | Quality       | Overall            |                 |       |      |
|---------------------------|----------------------|-------|----------------|--------------|-------------------|----------------|---------------|-----------------|----------------|----------------|------------|---------------|--------------------|-----------------|-------|------|
|                           |                      |       | Weight<br>(mg) | 6/64"<br>(%) | Color<br>(Agtron) | Extract<br>(%) | Wort<br>Color | Wort<br>Clarity | Protein<br>(%) | Protein<br>(%) | S/T<br>(%) | DP<br>(°ASBC) | amylase<br>(20°DU) | glucan<br>(ppm) | Score | Rank |
| 1569                      | ND16318              | 6     | 31.3           | 74.4         | 44                | 78.2           | 2.2           | 1               | 12.5           | 6.24           | 52.9       | 140           | 65.5               | 271             | 25    | 9    |
| 1570                      | 6B94-8253            | 6     | 31.3           | 63.3         | 44                | 77.4           | 2.2           | 1               | 12.5           | 5.74           | 48.4       | 155           | 67.6               | 214             | 29    | 3    |
| 1571                      | 6B95-2482            | 6     | 29.0           | 53.5         | 56                | 78.2           | 1.8           | 1               | 12.2           | 5.37           | 45.0       | 178           | 67.9               | 209             | 29    | 3    |
| 1572                      | M104                 | 6     | 27.0           | 31.2         | 51                | 77.2           | 2.1           | 1               | 13.1           | 5.90           | 44.8       | 140           | 59.6               | 420             | 26    | 5    |
| 1573                      | MOREX                | 6     | 28.0           | 45.4         | 48                | 76.7           | 1.7           | 1               | 14.4           | 6.18           | 43.8       | 189           | 68.3               | 248             | 12    | 45   |
| 1574                      | ROBUST               | 6     | 29.7           | 53.7         | 46                | 77.3           | 1.6           | 1               | 14.4           | 5.60           | 41.1       | 195           | 55.4               | 374             | 16    | 36   |
| 1575                      | EXCEL                | 6     | 28.2           | 37.9         | 51                | 78.4           | 1.9           | 2               | 13.4           | 6.09           | 48.1       | 164           | 72.5               | 280             | 19    | 25   |
| 1576                      | STANDER              | 6     | 29.3           | 55.1         | 50                | 78.9           | 2.0           | 2               | 13.9           | 6.26           | 47.6       | 168           | 79.4               | 273             | 19    | 25   |
| 1577                      | MNBRITE              | 6     | 29.7           | 57.3         | 50                | 77.6           | 1.7           | 2               | 14.9           | 6.26           | 43.4       | 242           | 70.0               | 280             | 11    | 47   |
| 1578                      | LACEY                | 6     | 30.3           | 56.3         | 49                | 78.0           | 1.7           | 2               | 13.7           | 5.50           | 41.2       | 178           | 62.6               | 231             | 25    | 9    |
| 1579                      | AZURE                | 6     | 30.4           | 58.7         | 44                | 76.2           | 1.7           | 2               | 13.6           | 5.31           | 40.1       | 173           | 55.3               | 415             | 22    | 18   |
| 1580                      | FOSTER               | 6     | 29.4           | 58.4         | 44                | 77.3           | 1.7           | 2               | 13.0           | 5.58           | 43.8       | 176           | 70.9               | 335             | 16    | 36   |
| 1581                      | DRUMMOND             | 6     | 30.1           | 58.3         | 50                | 77.6           | 1.6           | 2               | 14.0           | 5.36           | 39.6       | 213           | 64.9               | 243             | 11    | 47   |
| 1582                      | B2978                | 6     | 27.5           | 40.1         | 57                | 78.1           | 1.7           | 2               | 13.0           | 5.77           | 44.9       | 186           | 79.3               | 380             | 18    | 31   |
| 1583                      | CONLON               | 6     | *36.0          | 73.1         | 42                | 77.5           | 1.5           | 2               | 14.1           | 4.81           | 35.9       | 123           | 63.4               | 371             | 16    | 36   |
| 1584                      | ND15422              | 6     | 30.4           | 57.8         | 52                | 77.8           | 1.7           | 2               | 13.6           | 5.70           | 42.8       | 202           | 67.4               | 254             | 21    | 22   |
| 1585                      | ND16301              | 6     | 30.6           | 62.6         | 52                | 78.7           | 1.6           | 1               | 13.3           | 5.58           | 43.9       | 198           | 68.6               | 266             | 26    | 5    |
| 1586                      | ND16318              | 6     | 30.9           | 72.3         | 46                | 78.1           | 1.8           | 1               | 13.3           | 5.85           | 45.6       | 171           | 62.3               | 345             | 26    | 5    |
| 1587                      | 6B94-8253            | 6     | 30.6           | 64.3         | 46                | 77.6           | 1.8           | 1               | 13.7           | 5.68           | 42.1       | 183           | 63.4               | 237             | 22    | 18   |
| 1588                      | 6B95-2482            | 6     | 28.6           | 54.2         | 52                | 77.0           | 1.8           | 2               | 13.7           | 5.19           | 38.6       | 198           | 60.9               | 288             | 18    | 31   |
| 1589                      | M104                 | 6     | 28.6           | 48.1         | 48                | 78.5           | 1.8           | 1               | 12.8           | 5.89           | 47.0       | 160           | 70.5               | 268             | 26    | 5    |
| 1546                      | MOREX MALT CHECK     | 6     | 31.5           | 74.2         | 69                | 80.2           | 1.6           | 1               | 12.0           | 5.75           | 51.1       | 136           | 65.6               | 147             | 43    |      |
| 1567                      | MOREX MALT CHECK     | 6     | 31.6           | 74.2         | 73                | 79.8           | 1.7           | 1               | 12.3           | 5.94           | 50.5       | 140           | 65.6               | 168             | 36    |      |
| 1590                      | MOREX MALT CHECK     | 6     | 31.6           | 73.7         | 72                | 79.6           | 1.6           | 1               | 12.6           | 5.74           | 48.3       | 153           | 69.5               | 130             | 38    |      |
| Minima                    |                      |       | 25.1           | 24.8         | 31                | 75.9           | 1.5           |                 | 11.7           | 4.81           | 35.9       | 113           | 53.5               | 121             | 5     |      |
| Maxima                    |                      |       | 34.6           | 76.5         | 59                | 79.0           | 3.7           |                 | 16.3           | 7.00           | 55.1       | 244           | 82.3               | 463             | 34    |      |
| Means                     |                      |       | 29.6           | 54.1         | 45                | 77.6           | 2.0           |                 | 13.6           | 5.96           | 45.6       | 173           | 68.3               | 279             | 20    |      |
| Standard Deviations       |                      |       | 1.7            | 12.5         | 7                 | 0.7            | 0.4           |                 | 0.9            | 0.46           | 4.1        | 26            | 7.1                | 76              | 6     |      |
| Coefficients of Variation |                      |       | 5.8            | 23.1         | 15                | 1.0            | 21.0          |                 | 7.0            | 7.74           | 8.9        | 15            | 10.4               | 27              | 32    |      |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by R.D. Horsley and J.D. Franckowiak, North Dakota State University - Fargo

## 2000 EXPERIMENT LA11, LANGDON VARIETY YIELD TRIAL - LANGDON, ND

Table 44

| Lab No.                   | Variety or Selection  | Rowed | Kernel | on    | Barley | Malt    |      | Barley | Wort    |         |      | Alpha- | Beta-   | Overall |    |    |
|---------------------------|-----------------------|-------|--------|-------|--------|---------|------|--------|---------|---------|------|--------|---------|---------|----|----|
|                           |                       |       | Weight | 6/64" | Color  | Extract | Wort | Wort   | Protein | Protein | S/T  | DP     | amylase | glucan  |    |    |
| 3521                      | BARONESSE             | 2     | 34.8   | 66.8  | 37     | 75.9    | 1.8  | 1      | 13.2    | 4.64    | 36.1 | 84     | 51.1    | 289     | 21 | 8  |
| 3522                      | CONLON                | 2     | 34.0   | 71.0  | 37     | 78.1    | 1.5  | 1      | 13.5    | 5.18    | 40.2 | 123    | 63.1    | 284     | 24 | 6  |
| 3523                      | MERIT                 | 2     | 34.2   | 48.0  | 49     | 78.7    | 2.3  | 1      | 13.1    | 6.14    | 48.7 | 115    | 75.3    | 212     | 21 | 8  |
| 3524                      | HARRINGTON            | 2     | 31.7   | 82.2  | 45     | 79.8    | 2.3  | 1      | 12.8    | 6.12    | 48.7 | 111    | 72.6    | 243     | 24 | 6  |
| 3525                      | LOGAN                 | 2     | 35.8   | 67.5  | 38     | 78.2    | 1.5  | 1      | 13.2    | 5.14    | 39.1 | 146    | 52.8    | 355     | 18 | 11 |
| 3526                      | STARK                 | 2     | 38.2   | 75.7  | 35     | 78.5    | 1.4  | 1      | 13.5    | 4.76    | 36.1 | 103    | 49.2    | 347     | 26 | 5  |
| 3527                      | FOSTER                | 6     | 33.1   | 74.8  | 35     | 78.1    | 2.0  | 1      | 12.7    | 5.71    | 45.9 | 168    | 67.9    | 333     | 31 | 2  |
| 3528                      | MOREX                 | 6     | 29.4   | 59.3  | 46     | 77.9    | 1.9  | 1      | 14.4    | 6.28    | 45.0 | 173    | 68.6    | 177     | 12 | 12 |
| 3529                      | STANDER               | 6     | 33.4   | 79.2  | 40     | 79.7    | 2.3  | 1      | 13.6    | 6.57    | 51.8 | 150    | 78.6    | 274     | 34 | 1  |
| 3530                      | DRUMMOND              | 6     | 32.1   | 78.3  | 43     | 79.3    | 1.8  | 1      | 14.2    | 6.00    | 45.2 | 179    | 70.9    | 184     | 30 | 3  |
| 3531                      | ND16453               | 2     | 39.5   | 87.5  | 38     | 79.2    | 2.1  | 1      | 14.0    | 6.34    | 46.6 | 127    | 66.2    | 258     | 21 | 8  |
| 3532                      | ND16461               | 2     | 39.3   | 83.4  | 38     | 79.4    | 1.9  | 2      | 12.2    | 5.01    | 42.7 | 82     | 66.9    | 558     | 29 | 4  |
| 3537                      | HARRINGTON MALT CHECK | 2     | 39.9   | 94.4  | 76     | 81.3    | 1.5  | 1      | 11.4    | 5.62    | 51.2 | 96     | 69.5    | 189     | 39 |    |
| Minima                    |                       |       | 29.4   | 48.0  | 35     | 75.9    | 1.4  |        | 12.2    | 4.64    | 36.1 | 82     | 49.2    | 177     | 12 |    |
| Maxima                    |                       |       | 39.5   | 87.5  | 49     | 79.8    | 2.3  |        | 14.4    | 6.57    | 51.8 | 179    | 78.6    | 558     | 34 |    |
| Means                     |                       |       | 34.6   | 72.8  | 40     | 78.6    | 1.9  |        | 13.4    | 5.66    | 43.8 | 130    | 65.3    | 293     | 24 |    |
| Standard Deviations       |                       |       | 3.1    | 11.1  | 5      | 1.1     | 0.3  |        | 0.7     | 0.68    | 5.1  | 33     | 9.6     | 102     | 6  |    |
| Coefficients of Variation |                       |       | 9.0    | 15.3  | 11     | 1.4     | 17.4 |        | 4.9     | 11.93   | 11.5 | 26     | 14.7    | 35      | 25 |    |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by J.D. Frankowiak and R.D. Horsley, North Dakota State University - Fargo

## 2000 EXPERIMENT LA12, LANGDON ADVANCED YIELD TRIAL - LANGDON, ND

Table 45

| Lab No.                   | Variety or Selection  | Rowed | Kernel         | on           | Barley            | Malt           | Barley        | Wort            | Alpha-         | Beta-          | Quality    | Overall       |                    |                 |       |      |
|---------------------------|-----------------------|-------|----------------|--------------|-------------------|----------------|---------------|-----------------|----------------|----------------|------------|---------------|--------------------|-----------------|-------|------|
|                           |                       |       | Weight<br>(mg) | 6/64"<br>(%) | Color<br>(Agtron) | Extract<br>(%) | Wort<br>Color | Wort<br>Clarity | Protein<br>(%) | Protein<br>(%) | S/T<br>(%) | DP<br>(°ASBC) | amylase<br>(20°DU) | glucan<br>(ppm) | Score | Rank |
| 3533                      | STANDER               | 6     | 32.9           | 80.6         | 46                | 79.6           | 2.2           | 1               | 13.0           | 6.47           | 52.8       | 144           | 77.9               | 289             | 34    | 2    |
| 3534                      | DRUMMOND              | 6     | 32.0           | 75.8         | 47                | 78.9           | 1.9           | 1               | 13.9           | 6.24           | 47.1       | 181           | 71.8               | 178             | 21    | 13   |
| 3535                      | CONLON                | 2     | 32.2           | 67.4         | 43                | 78.1           | 1.7           | 1               | 13.7           | 5.67           | 42.5       | 145           | 71.8               | 220             | 17    | 16   |
| 3536                      | LOGAN                 | 2     | 35.2           | 66.1         | 42                | 79.2           | 1.4           | 1               | 12.6           | 5.29           | 42.7       | 144           | 56.9               | 278             | 22    | 11   |
| 3538                      | 2N16461               | 2     | 38.3           | 79.6         | 37                | 79.0           | 1.5           | 1               | 12.7           | 5.08           | 40.9       | 92            | 66.7               | 561             | 25    | 7    |
| 3539                      | 2N16586               | 2     | 34.1           | 65.8         | 44                | 78.1           | 1.8           | 1               | 13.9           | 5.83           | 43.1       | 124           | 73.0               | 418             | 21    | 13   |
| 3540                      | 2N17268               | 2     | 38.5           | 84.2         | 35                | 78.4           | 1.4           | 1               | 13.2           | 4.89           | 38.5       | 122           | 61.4               | 317             | 27    | 6    |
| 3541                      | 2N17274               | 2     | 37.0           | 84.2         | 40                | 80.5           | 2.3           | 1               | 13.8           | 6.65           | 49.7       | 107           | 80.1               | 216             | 16    | 18   |
| 3542                      | 2N17275               | 2     | 38.0           | 87.6         | 42                | 80.6           | 2.2           | 1               | 14.1           | 6.62           | 49.1       | 110           | 78.6               | 238             | 22    | 11   |
| 3543                      | 2N17291               | 2     | 39.1           | 85.0         | 33                | 79.5           | 2.4           | 1               | 13.8           | 6.70           | 49.6       | 157           | 77.4               | 61              | 17    | 16   |
| 3544                      | 2N17318               | 2     | 42.0           | 90.0         | 37                | 80.1           | 1.5           | 1               | 12.2           | 5.87           | 50.2       | 134           | 60.4               | 180             | 39    | 1    |
| 3545                      | 2N17380               | 2     | 38.8           | 84.5         | 39                | 79.5           | 1.7           | 1               | 13.8           | 6.15           | 45.2       | 137           | 61.3               | 173             | 23    | 10   |
| 3546                      | 2N17389               | 2     | 36.1           | 73.4         | 41                | 78.6           | 1.2           | 1               | 13.8           | 4.86           | 35.7       | 136           | 48.2               | 315             | 24    | 9    |
| 3547                      | 2N17401               | 2     | 35.5           | 79.8         | 40                | 79.4           | 1.4           | 1               | 12.3           | 5.25           | 43.4       | 132           | 63.5               | 188             | 31    | 3    |
| 3548                      | 2N17424               | 2     | 36.4           | 85.2         | 42                | 78.7           | 1.6           | 1               | 13.6           | 5.29           | 39.3       | 148           | 76.6               | 323             | 12    | 19   |
| 3549                      | 2N17445               | 2     | 36.9           | 82.7         | 43                | 79.1           | 1.2           | 1               | 14.0           | 4.99           | 38.2       | 119           | 56.8               | 431             | 20    | 15   |
| 3550                      | 2N17459               | 2     | 35.6           | 66.6         | 44                | 77.5           | 1.4           | 1               | 12.9           | 5.06           | 39.4       | 118           | 53.7               | 227             | 28    | 5    |
| 3551                      | 2N17562               | 2     | 37.1           | 83.3         | 45                | 78.6           | 1.3           | 1               | 13.4           | 5.02           | 37.9       | 121           | 54.9               | 338             | 29    | 4    |
| 3552                      | 2N17602               | 2     | 37.0           | 96.3         | 42                | 79.1           | 1.2           | 1               | 14.6           | 5.01           | 35.5       | 123           | 56.8               | 338             | 25    | 7    |
| 3537                      | HARRINGTON MALT CHECK | 2     | 39.9           | 94.4         | 76                | 81.3           | 1.5           | 1               | 11.4           | 5.62           | 51.2       | 96            | 69.5               | 189             | 39    |      |
| Minima                    |                       |       | 32.0           | 65.8         | 33                | 77.5           | 1.2           |                 | 12.2           | 4.86           | 35.5       | 92            | 48.2               | 61              | 12    |      |
| Maxima                    |                       |       | 42.0           | 96.3         | 47                | 80.6           | 2.4           |                 | 14.6           | 6.70           | 52.8       | 181           | 80.1               | 561             | 39    |      |
| Means                     |                       |       | 36.5           | 79.9         | 41                | 79.1           | 1.6           |                 | 13.4           | 5.63           | 43.2       | 131           | 65.7               | 278             | 24    |      |
| Standard Deviations       |                       |       | 2.5            | 8.6          | 4                 | 0.8            | 0.4           |                 | 0.6            | 0.66           | 5.3        | 20            | 9.9                | 114             | 7     |      |
| Coefficients of Variation |                       |       | 6.9            | 10.8         | 9                 | 1.0            | 23.7          |                 | 4.8            | 11.77          | 12.3       | 15            | 15.1               | 41              | 28    |      |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by J.D. Frankowiak and R.D. Horsley, North Dakota State University - Fargo

## 2000 EXPERIMENT LA13, LANGDON INTERMEDIATE YIELD TRIAL - LANGDON, ND

Table 46

| Lab No.                   | Variety or Selection  | Rowed | Kernel | on       | Barley | Malt    |         | Barley | Wort    |         | Alpha-  | Beta- | Quality | Overall |    |    |
|---------------------------|-----------------------|-------|--------|----------|--------|---------|---------|--------|---------|---------|---------|-------|---------|---------|----|----|
|                           |                       |       | Weight | 6/64"    | Color  | Extract | Wort    | Wort   | Protein | Protein | S/T     | DP    | amylase | glucan  |    |    |
|                           |                       | (mg)  | (%)    | (Agtron) | (%)    | Color   | Clarity | (%)    | (%)     | (°ASBC) | (20°DU) | (ppm) | Score   | Rank    |    |    |
| 3553                      | STANDER               | 6     | 32.9   | 81.0     | 44     | 79.2    | 2.4     | 1      | 13.2    | 6.34    | 51.5    | 145   | 77.9    | 200     | 34 | 4  |
| 3554                      | DRUMMOND              | 6     | 30.8   | 70.8     | 47     | 78.4    | 1.9     | 1      | 13.3    | 5.84    | 44.0    | 178   | 67.0    | 96      | 33 | 7  |
| 3555                      | CONLON                | 2     | 38.8   | 86.3     | 40     | 80.4    | 1.7     | 1      | 12.1    | 5.08    | 42.1    | 121   | 64.9    | 241     | 46 | 2  |
| 3556                      | 2N16461               | 2     | 38.1   | 82.7     | 39     | 78.9    | 1.6     | 1      | 12.6    | 5.23    | 42.1    | 101   | 67.2    | 444     | 25 | 12 |
| 3557                      | 2N18071               | 2     | 40.8   | 87.5     | 41     | 80.3    | 2.0     | 1      | 13.8    | 6.37    | 47.3    | 114   | 76.2    | 234     | 26 | 11 |
| 3558                      | 2N18076               | 2     | 41.1   | 82.0     | 36     | 77.4    | 1.9     | 1      | 13.4    | 5.41    | 41.8    | 136   | 54.4    | 181     | 30 | 9  |
| 3559                      | 2N18079               | 2     | 40.3   | 77.1     | 33     | 77.6    | 1.8     | 1      | 13.7    | 5.23    | 39.9    | 144   | 52.4    | 469     | 13 | 15 |
| 3560                      | 2N18080               | 2     | 43.9   | 92.2     | 43     | 80.4    | 2.0     | 1      | 13.9    | 6.30    | 47.0    | 148   | 69.8    | 261     | 22 | 14 |
| 3562                      | 2N18126               | 2     | 41.3   | 87.9     | 44     | 81.0    | 1.6     | 1      | 13.7    | 5.64    | 43.0    | 126   | 63.4    | 288     | 34 | 4  |
| 3563                      | 2N18142               | 2     | 38.4   | 86.5     | 40     | 80.9    | 1.6     | 1      | 13.1    | 5.41    | 43.9    | 158   | 60.8    | 121     | 34 | 4  |
| 3564                      | 2N18160               | 2     | 38.4   | 87.3     | 46     | 80.8    | 1.5     | 1      | 12.0    | 4.64    | 41.9    | 139   | 53.3    | 260     | 47 | 1  |
| 3565                      | 2N18162               | 2     | 42.7   | 89.6     | 32     | 79.1    | 2.1     | 1      | 12.7    | 5.32    | 43.1    | 87    | 53.7    | 608     | 31 | 8  |
| 3566                      | 2N18168               | 2     | 41.7   | 85.8     | 35     | 78.8    | 1.7     | 1      | 13.8    | 5.09    | 37.7    | 159   | 52.0    | 268     | 27 | 10 |
| 3567                      | 2N18172               | 2     | 41.1   | 88.4     | 44     | 81.6    | 2.5     | 1      | 12.4    | 6.75    | 58.6    | 119   | 70.9    | 184     | 39 | 3  |
| 3568                      | 2N18173               | 2     | 39.3   | 89.2     | 43     | 81.4    | 2.5     | 1      | 12.7    | 6.62    | 54.9    | 141   | 70.5    | 202     | 25 | 12 |
| 3561                      | HARRINGTON MALT CHECK | 2     | 39.3   | 94.8     | 75     | 81.3    | 1.4     | 1      | 11.6    | 5.50    | 48.5    | 125   | 67.4    | 131     | 46 |    |
| Minima                    |                       |       | 30.8   | 70.8     | 32     | 77.4    | 1.5     |        | 12.0    | 4.64    | 37.7    | 87    | 52.0    | 96      | 13 |    |
| Maxima                    |                       |       | 43.9   | 92.2     | 47     | 81.6    | 2.5     |        | 13.9    | 6.75    | 58.6    | 178   | 77.9    | 608     | 47 |    |
| Means                     |                       |       | 39.3   | 85.0     | 40     | 79.7    | 1.9     |        | 13.1    | 5.68    | 45.3    | 135   | 63.6    | 270     | 31 |    |
| Standard Deviations       |                       |       | 3.5    | 5.5      | 5      | 1.4     | 0.3     |        | 0.6     | 0.65    | 5.7     | 24    | 8.8     | 137     | 9  |    |
| Coefficients of Variation |                       |       | 8.8    | 6.5      | 12     | 1.7     | 17.6    |        | 4.9     | 11.35   | 12.7    | 18    | 13.8    | 51      | 28 |    |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by J.D. Frankowiak and R.D. Horsley, North Dakota State University - Fargo

## 2000 EXPERIMENT LA14, LANGDON INTERMEDIATE YIELD TRIAL - LANGDON, ND

Table 47

| Lab No.                   | Variety or Selection  | Rowed | Kernel | on    | Barley | Malt    |            | Barley       | Wort        | S/T         | DP   | Alpha-  | Beta-   | Quality      | Overall |    |
|---------------------------|-----------------------|-------|--------|-------|--------|---------|------------|--------------|-------------|-------------|------|---------|---------|--------------|---------|----|
|                           |                       |       | Weight | 6/64" | Color  | Extract | Wort Color | Wort Clarity | Protein (%) | Protein (%) | (%)  | (°ASBC) | (20°DU) | glucan Score | Rank    |    |
| 3569                      | STANDER               | 6     | 32.0   | 74.9  | 37     | 79.7    | 2.7        | 1            | 15.0        | 7.07        | 48.5 | 190     | 88.4    | 194          | 19      | 6  |
| 3570                      | DRUMMOND              | 6     | 31.3   | 76.6  | 45     | 79.0    | 2.1        | 1            | 14.8        | 6.27        | 43.5 | 206     | 72.8    | 104          | 28      | 1  |
| 3571                      | CONLON                | 2     | 32.8   | 70.0  | 35     | 78.8    | 1.9        | 1            | 15.0        | 5.67        | 39.8 | 148     | 75.1    | 324          | 9       | 15 |
| 3572                      | 2N16461               | 2     | 35.4   | 69.9  | 39     | 78.1    | 1.6        | 1            | 14.4        | 5.35        | 37.7 | 115     | 72.2    | 482          | 16      | 8  |
| 3573                      | 2N18185               | 2     | 37.5   | 85.2  | 39     | 79.6    | 1.9        | 1            | 14.2        | 5.66        | 40.1 | 140     | 62.3    | 399          | 20      | 5  |
| 3574                      | 2N18203               | 2     | 35.3   | 75.2  | 37     | 77.6    | 1.9        | 1            | 14.7        | 5.91        | 41.9 | 183     | 62.5    | 294          | 13      | 12 |
| 3575                      | 2N18204               | 2     | 37.2   | 76.0  | 30     | 79.0    | 1.8        | 1            | 13.9        | 5.33        | 39.3 | 170     | 60.6    | 317          | 9       | 15 |
| 3576                      | 2N18208               | 2     | 37.2   | 86.0  | 31     | 77.5    | 2.1        | 1            | 15.1        | 6.21        | 42.9 | 177     | 66.8    | 315          | 10      | 13 |
| 3577                      | 2N18220               | 2     | 35.0   | 77.0  | 40     | 78.3    | 1.5        | 1            | 14.1        | 5.43        | 38.6 | 111     | 57.2    | 334          | 16      | 8  |
| 3578                      | 2N18234               | 2     | 32.9   | 70.0  | 36     | 80.1    | 1.6        | 1            | 14.7        | 4.98        | 34.0 | 123     | 65.7    | 564          | 23      | 3  |
| 3579                      | 2N18243               | 2     | 38.0   | 88.2  | 34     | 78.9    | 2.0        | 1            | 15.1        | 5.70        | 40.3 | 131     | 66.9    | 531          | 21      | 4  |
| 3580                      | 2N18253               | 2     | 37.1   | 73.8  | 39     | 78.0    | 1.7        | 1            | 14.9        | 6.40        | 44.3 | 188     | 59.0    | 291          | 10      | 13 |
| 3581                      | 2N18271               | 2     | 35.6   | 83.0  | 40     | 79.6    | 1.8        | 1            | 14.1        | 5.45        | 40.9 | 124     | 63.4    | 365          | 24      | 2  |
| 3582                      | 2N18272               | 2     | 35.5   | 83.0  | 38     | 80.2    | 1.6        | 1            | 13.7        | 5.34        | 39.7 | 118     | 64.9    | 354          | 19      | 6  |
| 3583                      | 2N18281               | 2     | 37.4   | 72.9  | 39     | 78.3    | 1.8        | 1            | 14.8        | 6.30        | 43.8 | 161     | 56.6    | 199          | 14      | 11 |
| 3584                      | 2N18282               | 2     | 39.4   | 86.7  | 38     | 79.2    | 2.1        | 1            | 14.7        | 6.54        | 45.7 | 156     | 55.6    | 366          | 16      | 8  |
| 3585                      | HARRINGTON MALT CHECK | 2     | 39.6   | 94.6  | 73     | 81.6    | 1.4        | 1            | 11.6        | 5.48        | 50.7 | 112     | 67.7    | 112          | 46      |    |
| Minima                    |                       |       | 31.3   | 69.9  | 30     | 77.5    | 1.5        |              | 13.7        | 4.98        | 34.0 | 111     | 55.6    | 104          | 9       |    |
| Maxima                    |                       |       | 39.4   | 88.2  | 45     | 80.2    | 2.7        |              | 15.1        | 7.07        | 48.5 | 206     | 88.4    | 564          | 28      |    |
| Means                     |                       |       | 35.6   | 78.0  | 37     | 78.9    | 1.9        |              | 14.6        | 5.85        | 41.3 | 153     | 65.6    | 340          | 17      |    |
| Standard Deviations       |                       |       | 2.3    | 6.4   | 4      | 0.8     | 0.3        |              | 0.5         | 0.56        | 3.5  | 31      | 8.4     | 120          | 6       |    |
| Coefficients of Variation |                       |       | 6.6    | 8.2   | 10     | 1.1     | 15.1       |              | 3.1         | 9.59        | 8.4  | 20      | 12.8    | 35           | 34      |    |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by J.D. Frankowiak and R.D. Horsley, North Dakota State University - Fargo

## 2000 EXPERIMENT LA15, LANGDON INTERMEDIATE YIELD TRIAL - LANGDON, ND

Table 48

| Lab No.                   | Variety or Selection  | Rowed | Kernel | on       | Barley | Malt    | Barley  | Wort |         |         | Alpha-  | Beta- | Quality | Overall |    |    |
|---------------------------|-----------------------|-------|--------|----------|--------|---------|---------|------|---------|---------|---------|-------|---------|---------|----|----|
|                           |                       |       | Weight | 6/64"    | Color  | Extract | Wort    | Wort | Protein | Protein | S/T     | DP    | amylase | glucan  |    |    |
|                           |                       | (mg)  | (%)    | (Agtron) | (%)    | Color   | Clarity | (%)  | (%)     | (°ASBC) | (20°DU) | (ppm) | Score   | Rank    |    |    |
| 3586                      | STANDER               | 6     | 32.5   | 80.6     | 37     | 79.2    | 2.6     | 1    | 14.7    | 6.99    | 50.0    | 190   | 83.8    | 191     | 22 | 3  |
| 3587                      | DRUMMOND              | 6     | 31.0   | 74.3     | 43     | 79.0    | 1.9     | 1    | 14.8    | 6.21    | 43.2    | 214   | 75.6    | 119     | 28 | 1  |
| 3588                      | CONLON                | 2     | 33.2   | 71.6     | 37     | 78.5    | 1.7     | 1    | 15.2    | 5.43    | 36.7    | 142   | 71.0    | 336     | 9  | 13 |
| 3589                      | 2N16461               | 2     | 37.6   | 78.5     | 37     | 79.5    | 1.7     | 1    | 13.0    | 4.95    | 38.3    | 101   | 68.4    | 435     | 25 | 2  |
| 3590                      | 2N18324               | 2     | 36.5   | 75.9     | 36     | 77.8    | 2.0     | 1    | 16.4    | 5.48    | 33.7    | 164   | 49.9    | 508     | 12 | 11 |
| 3591                      | 2N18337               | 2     | 37.5   | 84.0     | 35     | 80.6    | 1.6     | 1    | 14.7    | 5.67    | 39.4    | 154   | 69.4    | 354     | 12 | 11 |
| 3592                      | 2N18338               | 2     | 37.3   | 81.4     | 35     | 79.7    | 1.7     | 1    | 14.6    | 5.77    | 39.9    | 169   | 73.2    | 219     | 15 | 9  |
| 3593                      | 2N18341               | 2     | 36.6   | 81.6     | 37     | 80.7    | 1.5     | 1    | 13.9    | 4.91    | 36.6    | 108   | 63.4    | 448     | 20 | 5  |
| 3594                      | 2N18364               | 2     | 37.1   | 81.0     | 35     | 78.4    | 1.7     | 1    | 14.6    | 5.34    | 38.8    | 150   | 63.7    | 403     | 9  | 13 |
| 3595                      | 2N18365               | 2     | 36.2   | 76.9     | 43     | 81.1    | 2.2     | 1    | 13.8    | 6.50    | 49.7    | 99    | 87.3    | 292     | 19 | 7  |
| 3596                      | 2N18366               | 2     | 34.4   | 74.4     | 39     | 79.8    | 2.0     | 1    | 14.5    | 6.05    | 42.7    | 138   | 95.6    | 231     | 21 | 4  |
| 3597                      | 2N18370               | 2     | 35.3   | 74.3     | 36     | 79.4    | 1.9     | 1    | 15.0    | 6.05    | 42.3    | 131   | 81.7    | 344     | 18 | 8  |
| 3598                      | 2N18376               | 2     | 33.3   | 76.4     | 34     | 78.8    | 3.1     | 1    | 16.2    | 7.74    | 48.2    | 148   | 67.6    | 186     | 9  | 13 |
| 3599                      | 2N18380               | 2     | 36.4   | 81.8     | 37     | 81.9    | 1.8     | 1    | 13.6    | 5.61    | 42.3    | 149   | 72.0    | 598     | 20 | 5  |
| 3600                      | 2N18387               | 2     | 37.5   | 77.9     | 38     | 85.9    | 2.6     | 1    | 15.6    | 7.08    | 46.4    | 148   | 67.3    | 234     | 15 | 9  |
| 3585                      | HARRINGTON MALT CHECK | 2     | 39.6   | 94.6     | 73     | 81.6    | 1.4     | 1    | 11.6    | 5.48    | 50.7    | 112   | 67.7    | 112     | 46 |    |
| Minima                    |                       |       | 31.0   | 71.6     | 34     | 77.8    | 1.5     |      | 13.0    | 4.91    | 33.7    | 99    | 49.9    | 119     | 9  |    |
| Maxima                    |                       |       | 37.6   | 84.0     | 43     | 85.9    | 3.1     |      | 16.4    | 7.74    | 50.0    | 214   | 95.6    | 598     | 28 |    |
| Means                     |                       |       | 35.5   | 78.0     | 37     | 80.0    | 2.0     |      | 14.7    | 5.99    | 41.9    | 147   | 72.7    | 327     | 17 |    |
| Standard Deviations       |                       |       | 2.1    | 3.6      | 3      | 2.0     | 0.5     |      | 0.9     | 0.81    | 5.0     | 31    | 11.1    | 134     | 6  |    |
| Coefficients of Variation |                       |       | 5.9    | 4.6      | 7      | 2.4     | 23.2    |      | 6.3     | 13.48   | 11.9    | 21    | 15.3    | 41      | 35 |    |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by J.D. Frankowiak and R.D. Horsley, North Dakota State University - Fargo

## 2000 EXPERIMENT CR11, CARRINGTON VARIETY YIELD TRIAL - CARRINGTON, ND

Table 49

| Lab No.                   | Variety or Selection  | Rowed | Kernel | on       | Barley | Malt    | Barley  | Wort | Alpha-  | Beta-   | Quality | Overall |       |      |    |    |
|---------------------------|-----------------------|-------|--------|----------|--------|---------|---------|------|---------|---------|---------|---------|-------|------|----|----|
|                           |                       |       | Weight | 6/64"    | Color  | Extract | Wort    | Wort | Protein | Protein |         |         |       |      |    |    |
|                           |                       | (mg)  | (%)    | (Agtron) | (%)    | Color   | Clarity | (%)  | (%)     | (°ASBC) | (20°DU) | (ppm)   | Score | Rank |    |    |
| 3601                      | BARONESSE             | 2     | 33.9   | 67.1     | 29     | 76.6    | 2.5     | 2    | 14.5    | 4.94    | 35.8    | 98      | 58.7  | 153  | 15 | 6  |
| 3602                      | CONLON                | 2     | 36.1   | 74.0     | 32     | 78.0    | 1.8     | 1    | 14.7    | 5.45    | 39.3    | 129     | 76.4  | 267  | 19 | 3  |
| 3603                      | MERIT                 | 2     | 33.7   | 61.5     | 36     | 80.0    | 2.6     | 1    | 14.8    | 6.61    | 45.6    | 171     | 100.8 | 174  | 17 | 4  |
| 3604                      | HARRINGTON            | 2     | 32.2   | 51.2     | 35     | 77.8    | 2.0     | 1    | 15.5    | 6.07    | 39.4    | 121     | 70.0  | 250  | 12 | 10 |
| 3605                      | LOGAN                 | 2     | 37.3   | 75.5     | 31     | 77.9    | 1.9     | 1    | 14.0    | 5.66    | 41.6    | 138     | 63.2  | 208  | 17 | 4  |
| 3606                      | STARK                 | 2     | 39.4   | 93.7     | 35     | 78.7    | 1.6     | 1    | 14.3    | 5.45    | 39.4    | 129     | 59.8  | 247  | 26 | 1  |
| 3607                      | FOSTER                | 6     | 31.6   | 67.0     | 29     | 76.9    | 2.5     | 1    | 14.5    | 6.51    | 46.4    | 164     | 76.3  | 297  | 13 | 8  |
| 3609                      | MOREX                 | 6     | 29.2   | 56.4     | 33     | 77.7    | 2.5     | 1    | 15.0    | 6.93    | 46.9    | 186     | 83.9  | 148  | 11 | 11 |
| 3610                      | STANDER               | 6     | 31.1   | 68.0     | 31     | 78.7    | 2.8     | 1    | 14.9    | 7.15    | 48.6    | 173     | 86.0  | 224  | 13 | 8  |
| 3611                      | DRUMMOND              | 6     | 31.4   | 71.0     | 36     | 78.4    | 2.5     | 1    | 14.7    | 6.60    | 46.7    | 188     | 77.0  | 128  | 20 | 2  |
| 3612                      | ND16453               | 2     | 37.8   | 83.5     | 28     | 77.8    | 2.4     | 1    | 15.6    | 7.01    | 46.4    | 136     | 72.5  | 154  | 9  | 12 |
| 3613                      | ND16461               | 2     | 35.4   | 66.2     | 26     | 77.7    | 2.2     | 1    | 13.7    | 5.45    | 42.3    | 95      | 82.6  | 308  | 14 | 7  |
| 3608                      | HARRINGTON MALT CHECK | 2     | 39.8   | 94.0     | 72     | 81.6    | 1.4     | 1    | 11.5    | 5.38    | 48.3    | 131     | 76.5  | 56   | 39 |    |
| Minima                    |                       |       | 29.2   | 51.2     | 26     | 76.6    | 1.6     |      | 13.7    | 4.94    | 35.8    | 95      | 58.7  | 128  | 9  |    |
| Maxima                    |                       |       | 39.4   | 93.7     | 36     | 80.0    | 2.8     |      | 15.6    | 7.15    | 48.6    | 188     | 100.8 | 308  | 26 |    |
| Means                     |                       |       | 34.1   | 69.6     | 32     | 78.0    | 2.3     |      | 14.7    | 6.15    | 43.2    | 144     | 75.6  | 213  | 16 |    |
| Standard Deviations       |                       |       | 3.1    | 11.4     | 3      | 0.9     | 0.4     |      | 0.6     | 0.74    | 4.1     | 32      | 12.0  | 62   | 5  |    |
| Coefficients of Variation |                       |       | 9.2    | 16.4     | 10     | 1.1     | 16.3    |      | 3.8     | 12.09   | 9.5     | 22      | 15.9  | 29   | 30 |    |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by J.D. Frankowiak and R.D. Horsley, North Dakota State University - Fargo

## 2000 EXPERIMENT CR12, CARRINGTON ADVANCED YIELD TRIAL - CARRINGTON, ND

Table 50

| Lab No.                   | Variety or Selection  | Rowed | Kernel         | on           | Barley            | Malt           | Barley        | Wort            | Alpha-         | Beta-          | Quality | Overall |      |     |    |    |
|---------------------------|-----------------------|-------|----------------|--------------|-------------------|----------------|---------------|-----------------|----------------|----------------|---------|---------|------|-----|----|----|
|                           |                       |       | Weight<br>(mg) | 6/64"<br>(%) | Color<br>(Agtron) | Extract<br>(%) | Wort<br>Color | Wort<br>Clarity | Protein<br>(%) | Protein<br>(%) |         |         |      |     |    |    |
| 3614                      | STANDER               | 6     | 30.8           | 64.8         | 31                | 78.0           | 3.1           | 1               | 14.3           | 7.29           | 51.9    | 165     | 88.7 | 201 | 17 | 11 |
| 3615                      | DRUMMOND              | 6     | 31.0           | 65.9         | 34                | 77.7           | 2.5           | 1               | 15.5           | 6.73           | 44.7    | 183     | 68.3 | 130 | 18 | 9  |
| 3616                      | CONLON                | 2     | 34.9           | 74.4         | 29                | 78.3           | 1.9           | 1               | 14.4           | 5.67           | 41.1    | 126     | 71.4 | 212 | 24 | 1  |
| 3617                      | LOGAN                 | 2     | 36.9           | 69.7         | 29                | 78.9           | 1.8           | 1               | 15.0           | 5.73           | 40.5    | 135     | 56.1 | 293 | 21 | 2  |
| 3618                      | 2N16461               | 2     | 34.1           | 68.1         | 25                | 79.0           | 2.1           | 1               | 13.0           | 5.52           | 43.3    | 86      | 75.3 | 305 | 19 | 6  |
| 3619                      | 2N16586               | 2     | 34.1           | 72.1         | 31                | 79.1           | 2.2           | 1               | 14.5           | 6.23           | 44.4    | 123     | 75.8 | 243 | 21 | 2  |
| 3620                      | 2N17268               | 2     | 36.4           | 77.7         | 30                | 78.4           | 1.7           | 1               | 14.6           | 5.16           | 35.8    | 127     | 65.6 | 173 | 19 | 6  |
| 3621                      | 2N17274               | 2     | 31.5           | 59.0         | 33                | 78.9           | 2.7           | 1               | 15.7           | 7.35           | 48.1    | 125     | 82.9 | 173 | 16 | 13 |
| 3622                      | 2N17275               | 2     | 33.5           | 66.3         | 34                | 78.9           | 2.3           | 1               | 15.6           | 6.90           | 45.1    | 119     | 78.3 | 222 | 21 | 2  |
| 3623                      | 2N17291               | 2     | 35.8           | 79.1         | 27                | 77.6           | 2.8           | 1               | 15.1           | 7.21           | 49.6    | 164     | 76.7 | 85  | 9  | 18 |
| 3624                      | 2N17318               | 2     | 36.0           | 69.0         | 29                | 78.5           | 1.9           | 1               | 14.1           | 6.24           | 44.6    | 138     | 60.7 | 169 | 18 | 9  |
| 3625                      | 2N17380               | 2     | 38.0           | 77.3         | 32                | 78.8           | 2.5           | 1               | 14.8           | 7.71           | 52.2    | 143     | 75.1 | 76  | 9  | 18 |
| 3626                      | 2N17389               | 2     | 33.2           | 51.0         | 33                | 77.1           | 1.7           | 1               | 15.3           | 5.87           | 38.7    | 139     | 56.9 | 196 | 12 | 14 |
| 3627                      | 2N17401               | 2     | 37.1           | 82.1         | 26                | 79.1           | 2.2           | 1               | 13.7           | 6.34           | 49.1    | 130     | 76.4 | 103 | 17 | 11 |
| 3628                      | 2N17424               | 2     | 32.8           | 70.8         | 34                | 77.3           | 2.1           | 1               | 15.3           | 6.26           | 41.7    | 152     | 89.5 | 217 | 10 | 17 |
| 3629                      | 2N17445               | 2     | 34.7           | 73.5         | 34                | 77.8           | 1.7           | 1               | 15.8           | 6.09           | 38.8    | 124     | 68.6 | 290 | 12 | 14 |
| 3630                      | 2N17459               | 2     | 36.6           | 70.0         | 31                | 77.3           | 1.9           | 1               | 14.2           | 5.70           | 41.2    | 122     | 60.5 | 184 | 20 | 5  |
| 3631                      | 2N17562               | 2     | 36.0           | 70.0         | 37                | 78.1           | 1.6           | 1               | 15.9           | 5.78           | 37.4    | 140     | 71.0 | 212 | 12 | 14 |
| 3632                      | 2N17602               | 2     | 36.0           | 81.8         | 31                | 78.3           | 1.7           | 1               | 14.5           | 5.69           | 39.6    | 117     | 66.6 | 244 | 19 | 6  |
| 3633                      | HARRINGTON MALT CHECK | 2     | 40.0           | 95.5         | 75                | 81.6           | 1.6           | 1               | 11.7           | 5.86           | 52.9    | 110     | 74.5 | 56  | 42 |    |
| Minima                    |                       |       | 30.8           | 51.0         | 25                | 77.1           | 1.6           |                 | 13.0           | 5.16           | 35.8    | 86      | 56.1 | 76  | 9  |    |
| Maxima                    |                       |       | 38.0           | 82.1         | 37                | 79.1           | 3.1           |                 | 15.9           | 7.71           | 52.2    | 183     | 89.5 | 305 | 24 |    |
| Means                     |                       |       | 34.7           | 70.7         | 31                | 78.3           | 2.1           |                 | 14.8           | 6.29           | 43.6    | 135     | 71.8 | 196 | 17 |    |
| Standard Deviations       |                       |       | 2.1            | 7.7          | 3                 | 0.7            | 0.4           |                 | 0.8            | 0.72           | 4.8     | 21      | 9.6  | 66  | 5  |    |
| Coefficients of Variation |                       |       | 6.2            | 10.8         | 10                | 0.8            | 20.0          |                 | 5.2            | 11.44          | 11.1    | 16      | 13.4 | 34  | 27 |    |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by J.D. Frankowiak and R.D. Horsley, North Dakota State University - Fargo

## 2000 EXPERIMENT CR13, CARRINGTON INTERMEDIATE YIELD TRIAL - CARRINGTON, ND

Table 51

| Lab No.                   | Variety or Selection  | Rowed | Kernel | on       | Barley | Malt    |         | Barley | Wort    |         | Alpha-  | Beta- | Quality | Overall |    |    |
|---------------------------|-----------------------|-------|--------|----------|--------|---------|---------|--------|---------|---------|---------|-------|---------|---------|----|----|
|                           |                       |       | Weight | 6/64"    | Color  | Extract | Wort    | Wort   | Protein | Protein | S/T     | DP    | amylase | glucan  |    |    |
|                           |                       | (mg)  | (%)    | (Agtron) | (%)    | Color   | Clarity | (%)    | (%)     | (°ASBC) | (20°DU) | (ppm) | Score   | Rank    |    |    |
| 3634                      | STANDER               | 6     | 30.9   | 61.1     | 33     | 77.8    | 3.5     | 1      | 14.8    | 7.90    | 54.2    | 159   | 92.1    | 128     | 20 | 2  |
| 3635                      | DRUMMOND              | 6     | 30.4   | 63.6     | 37     | 76.9    | 2.7     | 1      | 15.2    | 6.95    | 47.8    | 188   | 76.6    | 97      | 13 | 10 |
| 3636                      | CONLON                | 2     | 34.6   | 75.8     | 29     | 77.8    | 2.1     | 1      | 14.6    | 5.91    | 41.0    | 123   | 73.7    | 220     | 20 | 2  |
| 3637                      | 2N16461               | 2     | 34.8   | 65.2     | 29     | 77.8    | 2.2     | 1      | 13.9    | 5.92    | 43.4    | 96    | 78.2    | 261     | 17 | 7  |
| 3638                      | 2N18071               | 2     | 38.3   | 51.0     | 31     | 78.9    | 2.6     | 1      | 14.0    | 6.95    | 53.3    | 104   | 82.4    | 148     | 19 | 4  |
| 3639                      | 2N18076               | 2     | 37.8   | 80.6     | 30     | 77.0    | 2.4     | 1      | 14.6    | 6.55    | 47.3    | 123   | 66.8    | 109     | 16 | 8  |
| 3640                      | 2N18079               | 2     | 39.2   | 74.2     | 33     | 77.6    | 2.3     | 1      | 14.4    | 6.42    | 45.4    | 149   | 63.8    | 233     | 12 | 13 |
| 3641                      | 2N18080               | 2     | 41.4   | 82.5     | 36     | 79.0    | 2.5     | 1      | 15.4    | 7.59    | 49.2    | 142   | 79.4    | 259     | 13 | 10 |
| 3642                      | 2N18126               | 2     | 39.0   | 80.2     | 37     | 80.1    | 2.1     | 1      | 15.1    | 6.79    | 47.5    | 136   | 69.7    | 176     | 18 | 5  |
| 3643                      | 2N18142               | 2     | 35.7   | 74.2     | 34     | 79.1    | 2.1     | 1      | 14.8    | 6.69    | 46.8    | 176   | 71.9    | 93      | 13 | 10 |
| 3644                      | 2N18160               | 2     | 34.8   | 74.5     | 41     | 79.2    | 1.9     | 1      | 14.2    | 5.50    | 38.9    | 162   | 61.7    | 188     | 12 | 13 |
| 3645                      | 2N18162               | 2     | 40.1   | 77.6     | 27     | 77.1    | 2.5     | 1      | 14.5    | 6.30    | 44.3    | 100   | 59.9    | 359     | 15 | 9  |
| 3646                      | 2N18168               | 2     | 38.0   | 79.3     | 29     | 76.7    | 1.9     | 1      | 15.3    | 5.79    | 39.6    | 158   | 59.3    | 188     | 8  | 15 |
| 3647                      | 2N18172               | 2     | 40.8   | 87.9     | 37     | 80.8    | 2.8     | 1      | 14.0    | 7.40    | 53.2    | 140   | 79.4    | 98      | 23 | 1  |
| 3648                      | 2N18173               | 2     | 38.8   | 51.6     | 34     | 80.2    | 3.0     | 1      | 13.6    | 7.37    | 54.3    | 144   | 77.8    | 116     | 18 | 5  |
| 3633                      | HARRINGTON MALT CHECK | 2     | 40.0   | 95.5     | 75     | 81.6    | 1.6     | 1      | 11.7    | 5.86    | 52.9    | 110   | 74.5    | 56      | 42 |    |
| Minima                    |                       |       | 30.4   | 51.0     | 27     | 76.7    | 1.9     |        | 13.6    | 5.50    | 38.9    | 96    | 59.3    | 93      | 8  |    |
| Maxima                    |                       |       | 41.4   | 87.9     | 41     | 80.8    | 3.5     |        | 15.4    | 7.90    | 54.3    | 188   | 92.1    | 359     | 23 |    |
| Means                     |                       |       | 37.0   | 72.0     | 33     | 78.4    | 2.4     |        | 14.6    | 6.67    | 47.1    | 140   | 72.8    | 178     | 16 |    |
| Standard Deviations       |                       |       | 3.3    | 11.1     | 4      | 1.3     | 0.4     |        | 0.6     | 0.71    | 5.1     | 27    | 9.3     | 77      | 4  |    |
| Coefficients of Variation |                       |       | 9.0    | 15.4     | 12     | 1.7     | 18.1    |        | 3.8     | 10.64   | 10.9    | 19    | 12.8    | 43      | 25 |    |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by J.D. Frankowiak and R.D. Horsley, North Dakota State University - Fargo

## 2000 EXPERIMENT CR14, CARRINGTON INTERMEDIATE YIELD TRIAL - CARRINGTON, ND

Table 52

| Lab No.                   | Variety or Selection  | Rowed | Kernel | on    | Barley | Malt    |            | Barley       | Wort        | S/T         | DP      | Alpha-  | Beta-         | Overall      |    |    |
|---------------------------|-----------------------|-------|--------|-------|--------|---------|------------|--------------|-------------|-------------|---------|---------|---------------|--------------|----|----|
|                           |                       |       | Weight | 6/64" | Color  | Extract | Wort Color | Wort Clarity | Protein (%) | Protein (%) | (°ASBC) | (20°DU) | amylase (ppm) | glucan (ppm) |    |    |
| 3649                      | STANDER               | 6     | 32.3   | 86.8  | 32     | 80.0    | 3.0        | 1            | 14.4        | 7.36        | 54.0    | 146     | 76.6          | 198          | 29 | 2  |
| 3650                      | DRUMMOND              | 6     | 31.8   | 66.1  | 38     | 78.2    | 2.6        | 1            | 14.8        | 6.88        | 48.8    | 200     | 74.9          | 114          | 17 | 11 |
| 3651                      | CONLON                | 2     | 37.5   | 85.6  | 34     | 79.3    | 1.8        | 1            | 14.4        | 5.89        | 43.7    | 137     | 73.3          | 203          | 24 | 7  |
| 3652                      | 2N16461               | 2     | 34.4   | 65.9  | 28     | 78.1    | 2.2        | 1            | 13.1        | 5.78        | 47.0    | 99      | 72.1          | 262          | 21 | 8  |
| 3653                      | 2N18185               | 2     | 37.9   | 83.9  | 37     | 78.9    | 1.9        | 1            | 14.4        | 5.80        | 41.5    | 130     | 64.2          | 128          | 25 | 6  |
| 3654                      | 2N18203               | 2     | 37.6   | 81.3  | 32     | 77.2    | 2.2        | 1            | 15.2        | 6.67        | 45.0    | 178     | 64.1          | 137          | 14 | 14 |
| 3655                      | 2N18204               | 2     | 39.4   | 80.2  | 32     | 78.7    | 2.3        | 1            | 13.4        | 6.00        | 45.2    | 148     | 66.6          | 99           | 28 | 3  |
| 3656                      | 2N18208               | 2     | 38.0   | 83.0  | 35     | 76.8    | 2.3        | 1            | 15.2        | 6.58        | 43.7    | 165     | 66.8          | 159          | 10 | 15 |
| 3658                      | 2N18220               | 2     | 35.9   | 72.2  | 37     | 77.1    | 1.8        | 1            | 14.8        | 6.05        | 42.3    | 114     | 60.1          | 191          | 17 | 11 |
| 3659                      | 2N18234               | 2     | 35.5   | 71.4  | 31     | 78.7    | 1.8        | 1            | 14.9        | 5.44        | 37.3    | 114     | 60.2          | 376          | 16 | 13 |
| 3660                      | 2N18243               | 2     | 37.7   | 85.9  | 29     | 78.4    | 1.9        | 1            | 14.3        | 5.84        | 42.5    | 116     | 62.0          | 266          | 27 | 4  |
| 3661                      | 2N18253               | 2     | 39.9   | 83.2  | 38     | 77.9    | 2.0        | 1            | 14.5        | 6.57        | 48.0    | 156     | 58.1          | 192          | 7  | 16 |
| 3662                      | 2N18271               | 2     | 39.2   | 91.0  | 33     | 79.2    | 2.0        | 1            | 13.9        | 5.40        | 39.7    | 118     | 65.8          | 282          | 26 | 5  |
| 3663                      | 2N18272               | 2     | 39.9   | 90.4  | 33     | 79.5    | 1.8        | 1            | 14.1        | 5.56        | 41.2    | 117     | 64.9          | 304          | 31 | 1  |
| 3664                      | 2N18281               | 2     | 40.5   | 84.9  | 35     | 78.6    | 2.0        | 1            | 15.2        | 6.20        | 41.7    | 149     | 60.9          | 229          | 18 | 10 |
| 3665                      | 2N18282               | 2     | 41.9   | 86.0  | 38     | 78.2    | 2.1        | 1            | 15.5        | 6.63        | 44.2    | 161     | 57.9          | 227          | 21 | 8  |
| 3657                      | HARRINGTON MALT CHECK | 2     | 39.4   | 94.1  | 73     | 81.8    | 1.5        | 1            | 11.4        | 5.84        | 51.5    | 118     | 73.7          | 59           | 42 |    |
| Minima                    |                       |       | 31.8   | 65.9  | 28     | 76.8    | 1.8        |              | 13.1        | 5.40        | 37.3    | 99      | 57.9          | 99           | 7  |    |
| Maxima                    |                       |       | 41.9   | 91.0  | 38     | 80.0    | 3.0        |              | 15.5        | 7.36        | 54.0    | 200     | 76.6          | 376          | 31 |    |
| Means                     |                       |       | 37.5   | 81.1  | 34     | 78.4    | 2.1        |              | 14.5        | 6.17        | 44.1    | 141     | 65.5          | 210          | 21 |    |
| Standard Deviations       |                       |       | 2.9    | 7.9   | 3      | 0.9     | 0.3        |              | 0.7         | 0.56        | 4.0     | 28      | 5.9           | 75           | 7  |    |
| Coefficients of Variation |                       |       | 7.6    | 9.8   | 9      | 1.1     | 15.7       |              | 4.6         | 9.13        | 9.0     | 20      | 9.0           | 36           | 34 |    |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by J.D. Frankowiak and R.D. Horsley, North Dakota State University - Fargo

## 2000 EXPERIMENT CR15, CARRINGTON INTERMEDIATE YIELD TRIAL - CARRINGTON, ND

Table 53

| Lab No.                   | Variety or Selection  | Rowed | Kernel       | on   | Barley | Malt     |             | Barley     | Wort         | S/T         | DP          | Alpha-  | Beta-   | Quality       | Overall      |    |
|---------------------------|-----------------------|-------|--------------|------|--------|----------|-------------|------------|--------------|-------------|-------------|---------|---------|---------------|--------------|----|
|                           |                       |       | Weight 6/64" | (mg) | (%)    | (Agtron) | Extract (%) | Wort Color | Wort Clarity | Protein (%) | Protein (%) | (°ASBC) | (20°DU) | amylase (ppm) | glucan (ppm) |    |
| 3666                      | STANDER               | 6     | 31.4         | 70.4 | 35     | 78.3     | 2.7         | 1          | 15.3         | 7.15        | 49.6        | 180     | 92.6    | 184           | 16           | 7  |
| 3667                      | DRUMMOND              | 6     | 32.0         | 71.7 | 41     | 77.5     | 2.2         | 1          | 14.5         | 6.36        | 46.0        | 210     | 78.1    | 98            | 16           | 7  |
| 3668                      | CONLON                | 2     | 37.3         | 81.7 | 35     | 77.9     | 1.6         | 1          | 14.4         | 5.46        | 39.4        | 148     | 69.7    | 268           | 8            | 15 |
| 3669                      | 2N16461               | 2     | 36.7         | 70.6 | 31     | 78.0     | 1.9         | 1          | 13.3         | 5.39        | 41.8        | 104     | 74.5    | 329           | 19           | 3  |
| 3670                      | 2N18324               | 2     | 38.2         | 72.9 | 34     | 76.4     | 1.7         | 1          | 16.1         | 5.24        | 33.6        | 190     | 52.7    | 373           | 11           | 13 |
| 3671                      | 2N18337               | 2     | 39.4         | 81.2 | 30     | 76.6     | 1.6         | 1          | 14.9         | 5.46        | 37.5        | 159     | 69.8    | 259           | 10           | 14 |
| 3672                      | 2N18338               | 2     | 39.1         | 82.5 | 31     | 79.1     | 1.9         | 1          | 14.3         | 6.04        | 44.5        | 140     | 74.1    | 324           | 13           | 11 |
| 3673                      | 2N18341               | 2     | 38.7         | 80.8 | 35     | 80.3     | 1.7         | 1          | 13.7         | 5.23        | 38.6        | 117     | 68.2    | 368           | 21           | 2  |
| 3674                      | 2N18364               | 2     | 38.3         | 85.7 | 28     | 77.4     | 2.1         | 1          | 14.7         | 5.88        | 41.9        | 148     | 67.8    | 245           | 18           | 5  |
| 3675                      | 2N18365               | 2     | 37.3         | 71.4 | 40     | 80.1     | 2.5         | 1          | 14.4         | 6.93        | 48.3        | 105     | 92.1    | 255           | 16           | 7  |
| 3676                      | 2N18366               | 2     | 37.7         | 81.6 | 37     | 79.9     | 2.1         | 1          | 14.0         | 6.35        | 48.5        | 134     | 90.3    | 202           | 16           | 7  |
| 3677                      | 2N18370               | 2     | 38.2         | 75.0 | 34     | 78.6     | 1.9         | 1          | 14.9         | 6.08        | 41.8        | 132     | 76.3    | 322           | 17           | 6  |
| 3678                      | 2N18376               | 2     | 36.0         | 80.1 | 33     | 78.3     | 2.8         | 1          | 15.7         | 7.47        | 48.3        | 136     | 73.4    | 243           | 13           | 11 |
| 3679                      | 2N18380               | 2     | 38.6         | 83.1 | 33     | 81.4     | 2.0         | 1          | 12.9         | 5.78        | 45.8        | 137     | 72.7    | 349           | 31           | 1  |
| 3680                      | 2N18387               | 2     | 38.5         | 78.8 | 29     | 84.1     | 1.4         | 1          | 15.4         | 6.14        | 42.5        | 163     | 64.2    | 402           | 19           | 3  |
| 3681                      | HARRINGTON MALT CHECK | 2     | 39.9         | 94.7 | 75     | 81.7     | 1.4         | 1          | 11.7         | 5.42        | 48.0        | 125     | 69.6    | 104           | 46           |    |
| Minima                    |                       |       | 31.4         | 70.4 | 28     | 76.4     | 1.4         |            | 12.9         | 5.23        | 33.6        | 104     | 52.7    | 98            | 8            |    |
| Maxima                    |                       |       | 39.4         | 85.7 | 41     | 84.1     | 2.8         |            | 16.1         | 7.47        | 49.6        | 210     | 92.6    | 402           | 31           |    |
| Means                     |                       |       | 37.2         | 77.8 | 34     | 78.9     | 2.0         |            | 14.6         | 6.07        | 43.2        | 147     | 74.4    | 281           | 16           |    |
| Standard Deviations       |                       |       | 2.4          | 5.2  | 4      | 2.0      | 0.4         |            | 0.9          | 0.69        | 4.6         | 30      | 10.7    | 82            | 5            |    |
| Coefficients of Variation |                       |       | 6.4          | 6.7  | 11     | 2.5      | 20.9        |            | 5.9          | 11.44       | 10.8        | 20      | 14.4    | 29            | 33           |    |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by J.D. Frankowiak and R.D. Horsley, North Dakota State University - Fargo

## 2000 EXPERIMENT MI11, MINOT VARIETY YIELD TRIAL - MINOT, ND

Table 54

| Lab No.                   | Variety or Selection  | Rowed | Kernel          | on   | Barley | Malt              |                | Barley        | Wort            | S/T            | DP             | Alpha-  | Beta-   | Quality          | Overall |    |
|---------------------------|-----------------------|-------|-----------------|------|--------|-------------------|----------------|---------------|-----------------|----------------|----------------|---------|---------|------------------|---------|----|
|                           |                       |       | Weight<br>6/64" | (mg) | (%)    | Color<br>(Agtron) | Extract<br>(%) | Wort<br>Color | Wort<br>Clarity | Protein<br>(%) | Protein<br>(%) | (°ASBC) | (20°DU) | amylase<br>(ppm) | glucan  |    |
| 3682                      | BRONESSE              | 2     | 35.1            | 65.7 | 43     | 75.4              | 2.4            | 2             | 14.2            | 4.44           | 33.0           | 88      | 45.6    | 349              | 15      | 10 |
| 3683                      | CONLON                | 2     | 35.4            | 70.4 | 43     | 76.9              | 1.6            | 1             | 14.3            | 5.06           | 37.9           | 117     | 62.2    | 308              | 16      | 9  |
| 3684                      | MERIT                 | 2     | 34.1            | 60.0 | 56     | 79.4              | 1.8            | 1             | 13.9            | 5.78           | 43.1           | 129     | 84.9    | 267              | 24      | 2  |
| 3685                      | HARRINGTON            | 2     | 34.2            | 52.6 | 58     | 78.2              | 1.4            | 1             | 14.2            | 5.12           | 37.4           | 100     | 56.6    | 391              | 13      | 11 |
| 3686                      | LOGAN                 | 2     | 36.7            | 64.2 | 41     | 77.6              | 1.5            | 1             | 13.6            | 5.28           | 40.2           | 136     | 54.1    | 305              | 18      | 8  |
| 3687                      | STARK                 | 2     | 37.1            | 68.6 | 52     | 77.0              | 1.5            | 1             | 14.5            | 5.00           | 35.2           | 114     | 47.9    | 398              | 23      | 3  |
| 3688                      | FOSTER                | 6     | 30.7            | 60.5 | 40     | 77.3              | 1.9            | 1             | 13.6            | 6.00           | 45.8           | 165     | 68.3    | 269              | 26      | 1  |
| 3689                      | MOREX                 | 6     | 28.8            | 41.7 | 45     | 75.9              | 1.7            | 1             | 16.0            | 6.15           | 39.0           | 185     | 68.8    | 163              | 7       | 12 |
| 3690                      | STANDER               | 6     | 30.6            | 57.9 | 49     | 78.1              | 2.1            | 1             | 14.1            | 6.46           | 49.0           | 154     | 77.3    | 234              | 20      | 4  |
| 3691                      | DRUMMOND              | 6     | 29.6            | 54.0 | 50     | 76.7              | 1.7            | 1             | 14.5            | 5.76           | 40.6           | 202     | 66.9    | 135              | 19      | 6  |
| 3692                      | ND16453               | 2     | 38.1            | 78.5 | 45     | 77.8              | 2.3            | 1             | 15.2            | 6.72           | 45.9           | 137     | 67.7    | 132              | 20      | 4  |
| 3693                      | ND16461               | 2     | 36.8            | 72.0 | 44     | 78.5              | 1.9            | 1             | 13.2            | 5.15           | 40.9           | 83      | 60.8    | 425              | 19      | 6  |
| 3681                      | HARRINGTON MALT CHECK | 2     | 39.9            | 94.7 | 75     | 81.7              | 1.4            | 1             | 11.7            | 5.42           | 48.0           | 125     | 69.6    | 104              | 46      |    |
| Minima                    |                       |       | 28.8            | 41.7 | 40     | 75.4              | 1.4            |               | 13.2            | 4.44           | 33.0           | 83      | 45.6    | 132              | 7       |    |
| Maxima                    |                       |       | 38.1            | 78.5 | 58     | 79.4              | 2.4            |               | 16.0            | 6.72           | 49.0           | 202     | 84.9    | 425              | 26      |    |
| Means                     |                       |       | 33.9            | 62.2 | 47     | 77.4              | 1.8            |               | 14.3            | 5.58           | 40.7           | 134     | 63.4    | 281              | 18      |    |
| Standard Deviations       |                       |       | 3.2             | 10.0 | 6      | 1.1               | 0.3            |               | 0.8             | 0.68           | 4.7            | 37      | 11.4    | 101              | 5       |    |
| Coefficients of Variation |                       |       | 9.4             | 16.0 | 12     | 1.4               | 18.0           |               | 5.3             | 12.14          | 11.5           | 28      | 18.0    | 36               | 28      |    |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by J.D. Frankowiak and R.D. Horsley, North Dakota State University - Fargo

## 2000 EXPERIMENT MI12, MINOT ADVANCED YIELD TRIAL - MINOT, ND

Table 55

| Lab No.                   | Variety or Selection  | Rowed | Kernel         | on           | Barley            | Malt           | Barley        | Wort            | Alpha-         | Beta-          | Quality    | Overall       |                    |                 |       |      |
|---------------------------|-----------------------|-------|----------------|--------------|-------------------|----------------|---------------|-----------------|----------------|----------------|------------|---------------|--------------------|-----------------|-------|------|
|                           |                       |       | Weight<br>(mg) | 6/64"<br>(%) | Color<br>(Agtron) | Extract<br>(%) | Wort<br>Color | Wort<br>Clarity | Protein<br>(%) | Protein<br>(%) | S/T<br>(%) | DP<br>(°ASBC) | amylase<br>(20°DU) | glucan<br>(ppm) | Score | Rank |
| 3694                      | STANDER               | 6     | 29.1           | 56.8         | 54                | 79.1           | 2.1           | 1               | 13.6           | 6.56           | 51.5       | 145           | 77.7               | 167             | 26    | 1    |
| 3695                      | DRUMMOND              | 6     | 30.1           | 57.2         | 48                | 77.6           | 1.7           | 1               | 14.7           | 5.80           | 41.0       | *197          | 64.6               | 168             | 17    | 10   |
| 3696                      | CONLON                | 2     | 34.6           | 69.9         | 43                | 77.6           | 1.6           | 1               | 14.2           | 5.20           | 38.0       | 123           | 65.0               | 245             | 15    | 14   |
| 3697                      | LOGAN                 | 2     | 36.0           | 66.3         | 46                | 78.7           | 1.5           | 1               | 13.6           | 5.30           | 39.9       | 133           | 52.7               | 355             | 17    | 10   |
| 3698                      | 2N16461               | 2     | 36.5           | 71.9         | 46                | 79.3           | 1.9           | 1               | 12.4           | 5.25           | 43.6       | 85            | 59.0               | 494             | 24    | 2    |
| 3699                      | 2N16586               | 2     | 34.4           | 66.1         | 39                | 78.0           | 1.8           | 1               | 14.7           | 5.85           | 41.4       | 121           | 67.3               | 344             | 17    | 10   |
| 3700                      | 2N17268               | 2     | 37.0           | 71.8         | 42                | 77.0           | 1.5           | 1               | 14.1           | 4.92           | 35.9       | 138           | 60.6               | 328             | 13    | 15   |
| 3701                      | 2N17274               | 2     | 36.5           | 75.6         | 48                | 79.1           | 1.9           | 1               | 15.0           | 6.47           | 44.3       | 110           | 77.0               | 298             | 18    | 9    |
| 3702                      | 2N17275               | 2     | 35.7           | 74.0         | 44                | 79.3           | 1.9           | 1               | 15.1           | 6.49           | 43.4       | 117           | 76.2               | 293             | 21    | 6    |
| 3703                      | 2N17291               | 2     | 35.3           | 67.7         | 37                | 78.0           | 2.4           | 1               | 14.2           | 6.64           | 48.3       | 154           | 78.8               | 93              | 9     | 18   |
| 3704                      | 2N17318               | 2     | 38.2           | 73.8         | 38                | 77.7           | 1.6           | 1               | 14.3           | 5.64           | 40.8       | 135           | 54.1               | 336             | 20    | 7    |
| 3706                      | 2N17380               | 2     | 37.7           | 73.4         | 48                | 77.4           | 1.8           | 1               | 14.4           | 5.85           | 41.8       | 126           | 53.0               | 252             | 24    | 2    |
| 3707                      | 2N17389               | 2     | 34.1           | 55.7         | 49                | 77.4           | 1.3           | 1               | 14.6           | 4.98           | 35.1       | 128           | 48.2               | 473             | 23    | 4    |
| 3708                      | 2N17401               | 2     | 34.5           | 65.2         | 36                | 77.3           | 1.7           | 1               | 13.9           | 5.39           | 39.7       | 132           | 62.2               | 283             | 12    | 16   |
| 3709                      | 2N17424               | 2     | 35.4           | 73.4         | 52                | 77.3           | 1.7           | 1               | 15.5           | 5.35           | 35.7       | 149           | 69.1               | 471             | 5     | 19   |
| 3710                      | 2N17445               | 2     | 34.9           | 76.1         | 45                | 77.3           | 1.3           | 1               | 15.4           | 5.12           | 34.2       | 124           | 55.0               | 515             | 12    | 16   |
| 3711                      | 2N17459               | 2     | 37.9           | 71.7         | 52                | 77.8           | 1.6           | 1               | 13.9           | 4.91           | 37.0       | 113           | 47.5               | 339             | 23    | 4    |
| 3712                      | 2N17562               | 2     | 37.9           | 78.5         | 46                | 79.2           | 1.4           | 1               | 14.5           | 5.12           | 35.6       | 129           | 58.3               | 421             | 16    | 13   |
| 3713                      | 2N17602               | 2     | 34.8           | 77.4         | 46                | 78.0           | 1.4           | 1               | 14.7           | 5.17           | 35.6       | 118           | 52.4               | 621             | 20    | 7    |
| 3705                      | HARRINGTON MALT CHECK | 2     | 39.7           | 94.7         | 74                | 81.5           | 1.5           | 1               | 11.5           | 5.66           | 52.5       | 125           | 70.4               | 63              | 42    |      |
| Minima                    |                       |       | 29.1           | 55.7         | 36                | 77.0           | 1.3           |                 | 12.4           | 4.91           | 34.2       | 85            | 47.5               | 93              | 5     |      |
| Maxima                    |                       |       | 38.2           | 78.5         | 54                | 79.3           | 2.4           |                 | 15.5           | 6.64           | 51.5       | 154           | 78.8               | 621             | 26    |      |
| Means                     |                       |       | 35.3           | 69.6         | 45                | 78.0           | 1.7           |                 | 14.3           | 5.58           | 40.2       | 127           | 62.0               | 342             | 17    |      |
| Standard Deviations       |                       |       | 2.4            | 6.9          | 5                 | 0.8            | 0.3           |                 | 0.7            | 0.58           | 4.7        | 16            | 10.1               | 133             | 6     |      |
| Coefficients of Variation |                       |       | 6.8            | 9.9          | 11                | 1.0            | 16.1          |                 | 5.0            | 10.47          | 11.7       | 13            | 16.3               | 39              | 32    |      |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by J.D. Frankowiak and R.D. Horsley, North Dakota State University - Fargo

## 2000 EXPERIMENT MI13, MINOT INTERMEDIATE YIELD TRIAL - MINOT, ND

Table 56

| Lab No.                   | Variety or Selection  | Rowed | Kernel | on    | Barley | Malt    |            | Barley       | Wort        | S/T         | DP      | Alpha-  | Beta-         | Quality      | Overall |    |
|---------------------------|-----------------------|-------|--------|-------|--------|---------|------------|--------------|-------------|-------------|---------|---------|---------------|--------------|---------|----|
|                           |                       |       | Weight | 6/64" | Color  | Extract | Wort Color | Wort Clarity | Protein (%) | Protein (%) | (°ASBC) | (20°DU) | amylase (ppm) | glucan (ppm) |         |    |
| 3714                      | STANDER               | 6     | 30.5   | 64.2  | 47     | 79.3    | 2.1        | 1            | 13.2        | 6.44        | 50.0    | 167     | 69.5          | 293          | 25      | 5  |
| 3715                      | DRUMMOND              | 6     | 30.3   | 65.3  | 52     | 78.5    | 1.7        | 1            | 13.7        | 5.83        | 43.7    | 207     | 63.4          | 162          | 26      | 3  |
| 3716                      | CONLON                | 2     | 35.2   | 73.2  | 46     | 77.6    | 1.6        | 1            | 13.7        | 5.21        | 39.3    | 124     | 62.5          | 301          | 12      | 15 |
| 3717                      | 2N16461               | 2     | 37.1   | 74.4  | 43     | 79.1    | 1.8        | 1            | 12.6        | 5.16        | 41.6    | 84      | 54.6          | 431          | 23      | 6  |
| 3718                      | 2N18071               | 2     | 37.2   | 79.6  | 40     | 79.8    | 2.1        | 1            | 14.7        | 6.22        | 43.9    | 96      | 62.0          | 292          | 21      | 8  |
| 3719                      | 2N18076               | 2     | 40.1   | 72.7  | 46     | 77.7    | 2.2        | 1            | 14.3        | 5.80        | 41.1    | 129     | 52.5          | 271          | 28      | 2  |
| 3720                      | 2N18079               | 2     | 39.8   | 75.7  | 52     | 78.6    | 1.8        | 1            | 14.1        | 5.62        | 40.2    | 148     | 54.1          | 413          | 20      | 9  |
| 3721                      | 2N18080               | 2     | 41.2   | 76.0  | 46     | 78.6    | 1.8        | 1            | 16.2        | 6.62        | 41.8    | 166     | 61.1          | 317          | 15      | 13 |
| 3722                      | 2N18126               | 2     | 37.6   | 76.2  | 49     | 80.0    | 1.7        | 1            | 14.7        | 6.11        | 43.0    | 153     | 61.8          | 295          | 17      | 12 |
| 3723                      | 2N18142               | 2     | 35.9   | 75.4  | 44     | 80.0    | 1.6        | 1            | 14.1        | 5.79        | 42.5    | 176     | 59.7          | 266          | 20      | 9  |
| 3724                      | 2N18160               | 2     | 34.8   | 69.7  | 54     | 79.8    | 1.4        | 1            | 13.2        | 4.77        | 37.1    | 133     | 47.0          | 350          | 32      | 1  |
| 3725                      | 2N18162               | 2     | 40.2   | 77.3  | 33     | 77.5    | 1.9        | 1            | 14.9        | 5.83        | 40.1    | 107     | 54.9          | 488          | 22      | 7  |
| 3726                      | 2N18168               | 2     | 38.3   | 74.7  | 36     | 76.7    | 1.7        | 1            | 14.6        | 5.20        | 37.6    | 152     | 50.8          | 298          | 14      | 14 |
| 3727                      | 2N18172               | 2     | 39.5   | 83.2  | 42     | 81.2    | 1.9        | 1            | 12.9        | 6.33        | 49.6    | 140     | 65.1          | 181          | 26      | 3  |
| 3728                      | 2N18173               | 2     | 38.6   | 83.2  | 46     | 80.7    | 1.8        | 1            | 12.9        | 6.08        | 47.9    | 153     | 66.8          | 266          | 19      | 11 |
| 3729                      | HARRINGTON MALT CHECK | 2     | 40.0   | 94.7  | 70     | 82.1    | 1.5        | 1            | 11.8        | 5.77        | 51.9    | 136     | 74.8          | 61           | 39      |    |
| Minima                    |                       |       | 30.3   | 64.2  | 33     | 76.7    | 1.4        |              | 12.6        | 4.77        | 37.1    | 84      | 47.0          | 162          | 12      |    |
| Maxima                    |                       |       | 41.2   | 83.2  | 54     | 81.2    | 2.2        |              | 16.2        | 6.62        | 50.0    | 207     | 69.5          | 488          | 32      |    |
| Means                     |                       |       | 37.1   | 74.7  | 45     | 79.0    | 1.8        |              | 14.0        | 5.80        | 42.6    | 142     | 59.1          | 308          | 21      |    |
| Standard Deviations       |                       |       | 3.3    | 5.4   | 6      | 1.3     | 0.2        |              | 1.0         | 0.53        | 3.9     | 32      | 6.4           | 86           | 6       |    |
| Coefficients of Variation |                       |       | 8.9    | 7.2   | 13     | 1.6     | 11.5       |              | 6.8         | 9.13        | 9.2     | 22      | 10.9          | 28           | 26      |    |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by J.D. Frankowiak and R.D. Horsley, North Dakota State University - Fargo

## 2000 EXPERIMENT MI14, MINOT INTERMEDIATE YIELD TRIAL - MINOT, ND

Table 57

| Lab No.                   | Variety or Selection  | Rowed | Kernel | on    | Barley | Malt    |      | Barley | Wort    | S/T     | DP   | Alpha-  | Beta-   | Quality | Overall |    |
|---------------------------|-----------------------|-------|--------|-------|--------|---------|------|--------|---------|---------|------|---------|---------|---------|---------|----|
|                           |                       |       | Weight | 6/64" | Color  | Extract | Wort | Wort   | Protein | Protein | (%)  | (°ASBC) | (20°DU) | (ppm)   |         |    |
| 3730                      | STANDER               | 6     | 31.4   | 65.5  | 53     | 79.3    | 2.2  | 1      | 13.6    | 6.49    | 51.0 | 165     | 72.6    | 315     | 22      | 5  |
| 3731                      | DRUMMOND              | 6     | 30.2   | 65.9  | 52     | 78.3    | 1.8  | 1      | 13.9    | 5.88    | 43.3 | 204     | 67.3    | 191     | 26      | 2  |
| 3732                      | CONLON                | 2     | 33.8   | 70.5  | 42     | 78.1    | 1.7  | 1      | 13.9    | 5.25    | 38.6 | 118     | 63.6    | 379     | 16      | 11 |
| 3733                      | 2N16461               | 2     | 36.8   | 75.8  | 43     | 78.9    | 1.8  | 1      | 12.3    | 5.11    | 43.0 | 102     | 59.7    | 507     | 28      | 1  |
| 3734                      | 2N18185               | 2     | 38.9   | 81.0  | 44     | 78.4    | 1.7  | 1      | 14.0    | 5.09    | 37.8 | 119     | 54.0    | 390     | 26      | 2  |
| 3735                      | 2N18203               | 2     | 37.2   | 80.9  | 42     | 76.9    | 1.7  | 1      | 14.2    | 5.73    | 40.7 | 147     | 55.6    | 381     | 10      | 15 |
| 3736                      | 2N18204               | 2     | 38.3   | 72.7  | 33     | 78.1    | 1.8  | 1      | 14.2    | 5.21    | 38.6 | 124     | 54.1    | 362     | 22      | 5  |
| 3737                      | 2N18208               | 2     | 36.8   | 80.4  | 41     | 76.8    | 1.9  | 1      | 14.9    | 5.78    | 39.9 | 135     | 54.6    | 394     | 13      | 14 |
| 3738                      | 2N18220               | 2     | 36.7   | 74.2  | 47     | 77.6    | 1.6  | 1      | 14.7    | 5.44    | 38.5 | 94      | 51.7    | 460     | 9       | 16 |
| 3739                      | 2N18234               | 2     | 34.4   | 69.1  | 44     | 79.2    | 1.5  | 1      | 14.8    | 5.19    | 36.0 | 96      | 54.7    | 615     | 17      | 9  |
| 3740                      | 2N18243               | 2     | 39.4   | 86.3  | 42     | 78.8    | 2.0  | 1      | 14.5    | 5.41    | 38.5 | 107     | 55.0    | 511     | 22      | 5  |
| 3741                      | 2N18253               | 2     | 39.3   | 77.9  | 49     | 78.5    | 1.8  | 1      | 14.1    | 6.06    | 45.7 | 129     | 51.5    | 417     | 24      | 4  |
| 3742                      | 2N18271               | 2     | 37.1   | 82.3  | 39     | 79.8    | 2.2  | 1      | 13.8    | 5.48    | 42.5 | 97      | 60.9    | 458     | 21      | 8  |
| 3743                      | 2N18272               | 2     | 37.5   | 82.4  | 45     | 80.0    | 2.1  | 1      | 13.6    | 5.29    | 40.5 | 87      | 57.0    | 497     | 17      | 9  |
| 3744                      | 2N18281               | 2     | 40.7   | 81.3  | 45     | 77.1    | 1.8  | 1      | 15.9    | 6.32    | 40.9 | 141     | 50.9    | 375     | 15      | 12 |
| 3745                      | 2N18282               | 2     | 40.5   | 84.6  | 47     | 77.7    | 2.1  | 1      | 15.3    | 6.62    | 43.9 | 151     | 51.2    | 390     | 15      | 12 |
| 3729                      | HARRINGTON MALT CHECK | 2     | 40.0   | 94.7  | 70     | 82.1    | 1.5  | 1      | 11.8    | 5.77    | 51.9 | 136     | 74.8    | 61      | 39      |    |
| Minima                    |                       |       | 30.2   | 65.5  | 33     | 76.8    | 1.5  |        | 12.3    | 5.09    | 36.0 | 87      | 50.9    | 191     | 9       |    |
| Maxima                    |                       |       | 40.7   | 86.3  | 53     | 80.0    | 2.2  |        | 15.9    | 6.62    | 51.0 | 204     | 72.6    | 615     | 28      |    |
| Means                     |                       |       | 36.8   | 76.9  | 44     | 78.3    | 1.8  |        | 14.2    | 5.65    | 41.2 | 126     | 57.1    | 415     | 19      |    |
| Standard Deviations       |                       |       | 3.0    | 6.6   | 5      | 1.0     | 0.2  |        | 0.8     | 0.50    | 3.7  | 31      | 6.2     | 96      | 6       |    |
| Coefficients of Variation |                       |       | 8.2    | 8.6   | 11     | 1.2     | 11.3 |        | 5.8     | 8.88    | 8.9  | 25      | 10.9    | 23      | 31      |    |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by J.D. Frankowiak and R.D. Horsley, North Dakota State University - Fargo

## 2000 EXPERIMENT MI15, MINOT INTERMEDIATE YIELD TRIAL - MINOT, ND

Table 58

| Lab No.                   | Variety or Selection  | Rowed | Kernel       | on   | Barley    | Malt             | Barley         | Wort         | Alpha-      | Beta-       | Quality | Overall |      |     |    |    |
|---------------------------|-----------------------|-------|--------------|------|-----------|------------------|----------------|--------------|-------------|-------------|---------|---------|------|-----|----|----|
|                           |                       |       | Weight 6/64" | (mg) | Color (%) | Extract (Agtron) | Wort Color (%) | Wort Clarity | Protein (%) | Protein (%) |         |         |      |     |    |    |
| 3746                      | STANDER               | 6     | 31.5         | 63.9 | 50        | 79.0             | 2.2            | 1            | 13.4        | 6.56        | 49.7    | 153     | 69.5 | 167 | 28 | 4  |
| 3747                      | DRUMMOND              | 6     | 31.1         | 65.4 | 48        | 78.0             | 1.7            | 1            | 14.1        | 5.66        | 41.7    | 196     | 64.8 | 137 | 21 | 7  |
| 3748                      | CONLON                | 2     | 35.8         | 73.9 | 48        | 77.8             | 1.5            | 1            | 14.0        | 5.32        | 38.6    | 120     | 61.0 | 336 | 12 | 15 |
| 3749                      | 2N16461               | 2     | 37.0         | 72.3 | 44        | 78.9             | 2.1            | 1            | 12.8        | 5.02        | 42.2    | 76      | 53.3 | 470 | 27 | 5  |
| 3750                      | 2N18324               | 2     | 37.7         | 72.6 | 48        | 77.7             | 1.5            | 1            | 15.5        | 5.06        | 33.1    | 162     | 46.7 | 529 | 16 | 10 |
| 3751                      | 2N18337               | 2     | 39.3         | 84.2 | 46        | 79.2             | 1.7            | 1            | 14.1        | 5.76        | 42.7    | 125     | 61.1 | 319 | 23 | 6  |
| 3752                      | 2N18338               | 2     | 38.0         | 77.5 | 45        | 78.5             | 1.5            | 1            | 14.7        | 5.29        | 38.6    | 132     | 58.8 | 306 | 15 | 12 |
| 3754                      | 2N18341               | 2     | 39.5         | 82.4 | 45        | 81.1             | 2.0            | 2            | 13.0        | 5.06        | 40.0    | 93      | 57.9 | 452 | 30 | 3  |
| 3755                      | 2N18364               | 2     | 38.1         | 81.2 | 43        | 77.9             | 1.9            | 1            | 14.0        | 5.41        | 40.9    | 143     | 56.0 | 245 | 15 | 12 |
| 3756                      | 2N18365               | 2     | 36.8         | 73.3 | 47        | 80.1             | 2.0            | 1            | 13.4        | 6.17        | 47.6    | 91      | 82.2 | 223 | 17 | 9  |
| 3757                      | 2N18366               | 2     | 36.8         | 70.8 | 47        | 79.8             | 2.0            | 1            | 13.1        | 5.89        | 45.3    | 115     | 81.7 | 232 | 32 | 1  |
| 3758                      | 2N18370               | 2     | 36.5         | 68.0 | 45        | 78.4             | 1.6            | 1            | 15.2        | 5.83        | 39.4    | 118     | 67.0 | 335 | 16 | 10 |
| 3759                      | 2N18376               | 2     | 34.0         | 69.4 | 43        | 77.9             | 2.1            | 1            | 16.9        | 7.01        | 43.7    | 122     | 62.8 | 356 | 14 | 14 |
| 3760                      | 2N18380               | 2     | 38.0         | 82.1 | 49        | 82.4             | 1.6            | 1            | 12.6        | 5.32        | 44.4    | 111     | 57.0 | 659 | 32 | 1  |
| 3761                      | 2N18387               | 2     | 36.7         | 71.0 | 45        | 85.8             | *3.2           | 2            | 15.3        | 7.66        | 51.3    | 122     | 63.3 | 383 | 18 | 8  |
| 3753                      | HARRINGTON MALT CHECK | 2     | 40.1         | 94.9 | 77        | 81.8             | 1.4            | 1            | 11.5        | 5.47        | 50.8    | 116     | 73.4 | 94  | 48 |    |
| Minima                    |                       |       | 31.1         | 63.9 | 43        | 77.7             | 1.5            |              | 12.6        | 5.02        | 33.1    | 76      | 46.7 | 137 | 12 |    |
| Maxima                    |                       |       | 39.5         | 84.2 | 50        | 85.8             | 2.2            |              | 16.9        | 7.66        | 51.3    | 196     | 82.2 | 659 | 32 |    |
| Means                     |                       |       | 36.4         | 73.9 | 46        | 79.5             | 1.8            |              | 14.1        | 5.80        | 42.6    | 125     | 62.9 | 343 | 21 |    |
| Standard Deviations       |                       |       | 2.5          | 6.3  | 2         | 2.2              | 0.3            |              | 1.2         | 0.77        | 4.7     | 30      | 9.6  | 140 | 7  |    |
| Coefficients of Variation |                       |       | 6.8          | 8.6  | 5         | 2.8              | 14.1           |              | 8.5         | 13.23       | 11.0    | 24      | 15.2 | 41  | 33 |    |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by J.D. Frankowiak and R.D. Horsley, North Dakota State University - Fargo

## 2000 CY BEACON/HAZEN PROGENY ANALYSIS - FARGO AND PROSPER, NORTH DAKOTA

Table 59

| Lab No. | Variety or Selection | Location | Rowed | Kernel Weight (mg) | on 6/64" | Barley Color (%) | Malt Extract (Agtron) | Wort Color (%) | Barley Clarity | Wort Protein (%) | Wort Protein (%) | S/T (%) | DP (°ASBC) | Alpha-amylase (20°DU) | Beta-glucan (ppm) | Quality Score | Overall Rank |
|---------|----------------------|----------|-------|--------------------|----------|------------------|-----------------------|----------------|----------------|------------------|------------------|---------|------------|-----------------------|-------------------|---------------|--------------|
| 3992    | BH1                  | Fargo    | 6     | 27.6               | 37.2     | 50               | 75.2                  | 2.2            | 1              | 13.0             | 5.68             | 47.0    | 136        | 72.7                  | 137               | 21            | 240          |
| 3993    | BH2                  | Fargo    | 6     | 27.7               | 24.1     | 60               | 76.4                  | 2.2            | 1              | 12.4             | 5.54             | 45.0    | 142        | 70.9                  | 130               | 34            | 45           |
| 3994    | MOREX                | Fargo    | 6     | 25.1               | 28.0     | 49               | 76.1                  | 2.7            | 1              | 13.9             | 6.54             | 48.4    | 165        | 82.8                  | 37                | 11            | 356          |
| 3995    | BH3                  | Fargo    | 6     | 26.6               | 25.9     | 59               | 75.5                  | 2.6            | 1              | 13.7             | 6.40             | 49.0    | 147        | 74.5                  | 80                | 21            | 240          |
| 3996    | BH4                  | Fargo    | 6     | 30.1               | 48.7     | 48               | 74.9                  | 2.4            | 1              | 14.4             | 6.20             | 44.7    | 135        | 65.2                  | 222               | 18            | 303          |
| 3997    | BH5                  | Fargo    | 6     | 29.3               | 38.4     | 52               | 75.3                  | 2.4            | 1              | 13.6             | 6.22             | 48.0    | 155        | 70.4                  | 211               | 19            | 286          |
| 3998    | BEACON               | Fargo    | 6     | 27.0               | 35.2     | 59               | 76.6                  | 2.2            | 1              | 14.1             | 6.15             | 46.5    | 157        | 72.6                  | 29                | 9             | 361          |
| 3999    | BH6                  | Fargo    | 6     | 28.1               | 33.7     | 57               | 75.0                  | 2.2            | 1              | 12.5             | 5.59             | 46.6    | 130        | 66.4                  | 125               | 19            | 286          |
| 4000    | HAZEN                | Fargo    | 6     | 28.9               | 47.3     | 56               | 77.3                  | 2.5            | 1              | 12.8             | 5.97             | 48.2    | 144        | 67.9                  | 58                | 22            | 222          |
| 4001    | BH8                  | Fargo    | 6     | 27.8               | 30.9     | 54               | 75.4                  | 2.0            | 1              | 13.9             | 5.61             | 41.7    | 167        | 66.6                  | 71                | 22            | 222          |
| 4002    | FOSTER               | Fargo    | 6     | 28.6               | 51.5     | 46               | 76.8                  | 2.6            | 1              | 12.6             | 6.33             | 52.6    | 133        | 78.3                  | 90                | 20            | 266          |
| 4003    | BH9                  | Fargo    | 6     | 27.6               | 26.0     | 57               | 75.1                  | 2.2            | 1              | 12.5             | 5.29             | 43.8    | 131        | 60.9                  | 98                | 35            | 38           |
| 4004    | BH10                 | Fargo    | 6     | 30.1               | 41.4     | 54               | 76.2                  | 2.1            | 1              | 12.5             | 5.40             | 44.3    | 137        | 58.5                  | 182               | 30            | 87           |
| 4005    | BH11                 | Fargo    | 6     | 28.7               | 46.3     | 57               | 76.3                  | 2.3            | 1              | 12.8             | 5.73             | 46.6    | 120        | 70.5                  | 183               | 15            | 334          |
| 4007    | BH12                 | Fargo    | 6     | 27.1               | 24.0     | 55               | 74.3                  | 2.3            | 1              | 13.4             | 5.55             | 43.0    | 156        | 66.4                  | 80                | 25            | 173          |
| 4008    | BH13                 | Fargo    | 6     | 28.2               | 40.9     | 56               | 76.5                  | 1.8            | 1              | 12.7             | 5.02             | 39.7    | 113        | 59.5                  | 282               | 23            | 208          |
| 4009    | BH14                 | Fargo    | 6     | 27.7               | 26.1     | 55               | 76.0                  | 2.3            | 1              | 12.7             | 5.70             | 45.5    | 133        | 64.9                  | 105               | 26            | 146          |
| 4010    | BH15                 | Fargo    | 6     | 26.0               | 19.8     | 61               | 74.6                  | 2.1            | 1              | 13.3             | 5.38             | 41.5    | 167        | 65.3                  | 101               | 26            | 146          |
| 4011    | BH16                 | Fargo    | 6     | 26.8               | 12.7     | 61               | 73.1                  | 2.3            | 1              | 14.2             | 5.86             | 42.4    | 158        | 72.7                  | 57                | 20            | 266          |
| 4012    | BH17                 | Fargo    | 6     | 25.5               | 15.9     | 60               | 72.8                  | 2.3            | 1              | 13.4             | 6.02             | 46.2    | 129        | 82.6                  | 84                | 14            | 339          |
| 4013    | BH18                 | Fargo    | 6     | 26.6               | 24.6     | 64               | 74.9                  | 2.2            | 1              | 12.6             | 5.47             | 45.9    | 116        | 72.9                  | 131               | 22            | 222          |
| 4014    | BH19                 | Fargo    | 6     | 28.4               | 34.9     | 57               | 76.1                  | 2.0            | 1              | 12.5             | 5.14             | 43.1    | 127        | 62.4                  | 116               | 28            | 118          |
| 4015    | BH20                 | Fargo    | 6     | 27.7               | 47.4     | 57               | 75.6                  | 2.1            | 1              | 13.3             | 5.28             | 42.4    | 111        | 67.9                  | 192               | 22            | 222          |
| 4016    | BH21                 | Fargo    | 6     | 28.1               | 28.1     | 57               | 77.0                  | 1.8            | 1              | 13.3             | 5.75             | 45.9    | 119        | 65.0                  | 126               | 24            | 191          |
| 4017    | BH22                 | Fargo    | 6     | 27.7               | 20.2     | 58               | 74.4                  | 2.1            | 1              | 13.0             | 5.89             | 46.9    | 146        | 64.4                  | 94                | 24            | 191          |
| 4018    | BH23                 | Fargo    | 6     | 31.0               | 61.5     | 51               | 76.3                  | 2.3            | 1              | 13.8             | 6.25             | 46.5    | 141        | 74.0                  | 215               | 21            | 240          |
| 4019    | BH24                 | Fargo    | 6     | 25.6               | 29.1     | 49               | 76.1                  | 2.7            | 1              | 14.6             | *7.16            | 51.1    | 153        | 85.2                  | 83                | 16            | 326          |
| 4020    | BH25                 | Fargo    | 6     | 28.1               | 26.7     | 60               | 75.7                  | 2.1            | 1              | 13.5             | 5.77             | 42.9    | 131        | 65.8                  | 111               | 28            | 118          |
| 4021    | BH26                 | Fargo    | 6     | 28.0               | 31.4     | 62               | 74.9                  | 2.2            | 1              | 13.3             | 6.09             | 47.6    | 140        | 74.7                  | 148               | 21            | 240          |
| 4022    | BH27                 | Fargo    | 6     | 26.8               | 24.1     | 63               | 74.4                  | 1.8            | 1              | 13.0             | 5.29             | 41.0    | 111        | 62.7                  | 158               | 22            | 222          |

Table 59

| Lab No. | Variety or Selection | Location | Rowed | Kernel Weight (mg) | on 6/64" | Barley Color (Agtron) | Malt Extract (%) | Wort Color | Wort Clarity | Barley Protein (%) | Wort Protein (%) | S/T (%) | DP (°ASBC) | Alpha-amylase (20°DU) | Beta-glucan (ppm) | Quality Score | Overall Rank |
|---------|----------------------|----------|-------|--------------------|----------|-----------------------|------------------|------------|--------------|--------------------|------------------|---------|------------|-----------------------|-------------------|---------------|--------------|
| 4023    | BH28                 | Fargo    | 6     | 26.0               | 13.7     | 66                    | 75.2             | 2.0        | 1            | 12.3               | 5.48             | 44.7    | 141        | 64.4                  | 124               | 34            | 45           |
| 4024    | BH29                 | Fargo    | 6     | 27.3               | 34.1     | 60                    | 75.9             | 1.8        | 1            | 13.8               | 5.64             | 43.2    | 141        | 67.5                  | 192               | 25            | 173          |
| 4026    | BH30                 | Fargo    | 6     | 28.8               | 42.7     | 60                    | 74.7             | 1.9        | 1            | 13.1               | 5.26             | 40.6    | 115        | 57.8                  | 165               | 28            | 118          |
| 4027    | BH31                 | Fargo    | 6     | 28.3               | 35.9     | 54                    | 75.2             | 2.0        | 1            | 13.2               | 5.74             | 44.1    | 125        | 75.0                  | 169               | 20            | 266          |
| 4028    | BH32                 | Fargo    | 6     | 28.1               | 40.7     | 52                    | 76.8             | 2.2        | 1            | 12.8               | 5.96             | 47.6    | 141        | 82.7                  | 131               | 26            | 146          |
| 4029    | BH33                 | Fargo    | 6     | 28.5               | 40.0     | 58                    | 74.6             | 1.9        | 1            | 13.8               | 5.83             | 42.6    | 132        | 67.9                  | 151               | 24            | 191          |
| 4030    | BH34                 | Fargo    | 6     | 28.1               | 35.5     | 56                    | 76.0             | 1.7        | 1            | 12.6               | 5.14             | 44.0    | 113        | 60.8                  | 269               | 24            | 191          |
| 4031    | BH35                 | Fargo    | 6     | 26.6               | 23.9     | 67                    | 74.9             | 1.7        | 1            | 12.7               | 5.27             | 42.6    | 122        | 68.0                  | 160               | 22            | 222          |
| 4032    | BH36                 | Fargo    | 6     | 27.1               | 24.3     | 62                    | 74.7             | 1.9        | 1            | 12.9               | 5.45             | 44.2    | 125        | 68.2                  | 158               | 18            | 303          |
| 4033    | BH37                 | Fargo    | 6     | 27.3               | 31.2     | 62                    | 76.5             | 1.8        | 1            | 12.9               | 5.58             | 45.1    | 147        | 72.0                  | 254               | 25            | 173          |
| 4034    | BH38                 | Fargo    | 6     | 31.4               | 45.7     | 59                    | 75.8             | 2.0        | 1            | 13.5               | 5.62             | 41.8    | 119        | 61.7                  | 140               | 26            | 146          |
| 4035    | BH39                 | Fargo    | 6     | 28.4               | 27.6     | 58                    | 75.6             | 2.0        | 1            | 12.8               | 5.82             | 45.8    | 125        | 68.9                  | 108               | 24            | 191          |
| 4036    | BH40                 | Fargo    | 6     | 27.9               | 36.3     | 57                    | 74.5             | 2.1        | 1            | 14.2               | 6.17             | 45.1    | 151        | 74.8                  | 139               | 21            | 240          |
| 4037    | BH41                 | Fargo    | 6     | 28.6               | 38.9     | 59                    | 75.7             | 2.1        | 1            | 13.7               | 6.32             | 46.3    | 148        | 71.1                  | 114               | 23            | 208          |
| 4038    | BH42                 | Fargo    | 6     | 28.9               | 44.3     | 51                    | 76.6             | 2.3        | 1            | 13.7               | 5.89             | 43.6    | 109        | 73.5                  | 110               | 24            | 191          |
| 4039    | BH43                 | Fargo    | 6     | 28.0               | 23.5     | 60                    | 74.8             | 2.2        | 1            | 13.0               | 5.78             | 46.0    | 141        | 61.8                  | 145               | 26            | 146          |
| 4040    | BH44                 | Fargo    | 6     | 29.1               | 40.4     | 61                    | 75.7             | 2.1        | 1            | 13.4               | 5.70             | 44.0    | 135        | 69.0                  | 155               | 24            | 191          |
| 4041    | BH45                 | Fargo    | 6     | 25.6               | 25.0     | 65                    | 74.6             | 2.0        | 1            | 13.8               | 5.73             | 42.6    | 152        | 62.6                  | 144               | 29            | 105          |
| 4042    | BH46                 | Fargo    | 6     | 25.3               | 13.6     | 61                    | 73.6             | 2.2        | 1            | 13.6               | 5.96             | 45.6    | 156        | 73.1                  | 70                | 25            | 173          |
| 4043    | BH47                 | Fargo    | 6     | 28.4               | 29.2     | 60                    | 75.3             | 2.0        | 1            | 13.5               | 5.93             | 44.2    | 133        | 66.9                  | 168               | 24            | 191          |
| 4044    | BH48                 | Fargo    | 6     | 28.2               | 27.2     | 66                    | 75.1             | 2.2        | 1            | 13.1               | 5.98             | 46.8    | 154        | 71.9                  | 112               | 26            | 146          |
| 4045    | BH49                 | Fargo    | 6     | 27.9               | 26.0     | 67                    | 76.8             | 1.7        | 1            | 13.4               | 5.44             | 42.9    | 112        | 59.5                  | 127               | 26            | 146          |
| 4047    | BH50                 | Fargo    | 6     | 25.6               | 15.6     | 65                    | 74.1             | 2.0        | 1            | 13.8               | 6.05             | 45.3    | 166        | 74.9                  | 155               | 19            | 286          |
| 4048    | BH51                 | Fargo    | 6     | 28.3               | 25.5     | 57                    | 74.9             | 2.1        | 1            | 13.4               | 5.86             | 45.0    | 152        | 65.2                  | 203               | 27            | 131          |
| 4049    | FOSTER               | Fargo    | 6     | 28.5               | 49.8     | 45                    | 76.7             | 2.8        | 1            | 13.4               | 6.83             | 53.2    | 136        | 84.5                  | 121               | 20            | 266          |
| 4050    | BH52                 | Fargo    | 6     | 27.6               | 35.5     | 60                    | 81.2             | *2.9       | 2            | 14.5               | 4.85             | *35.7   | 141        | 70.4                  | *532              | 25            | 173          |
| 4051    | BH53                 | Fargo    | 6     | 26.5               | 26.4     | 57                    | 74.9             | 2.2        | 1            | 13.8               | 5.83             | 44.8    | 148        | 78.3                  | 133               | 29            | 105          |
| 4052    | BH54                 | Fargo    | 6     | 29.3               | 42.9     | 58                    | 76.4             | 2.0        | 1            | 14.1               | 5.91             | 42.2    | 172        | 74.6                  | 184               | 15            | 334          |
| 4053    | BH55                 | Fargo    | 6     | 27.9               | 37.0     | 60                    | 74.7             | 1.9        | 1            | 13.5               | 5.47             | 41.6    | 132        | 74.1                  | 147               | 26            | 146          |
| 4054    | BH56                 | Fargo    | 6     | 27.6               | 37.2     | 49                    | 75.3             | 2.2        | 1            | 13.1               | 5.70             | 45.6    | 138        | 80.4                  | 132               | 26            | 146          |

Table 59

| Lab No. | Variety or Selection | Location | Rowed | Kernel Weight (mg) | on 6/64" | Barley Color (Agtron) | Malt Extract (%) | Wort Color | Wort Clarity | Barley Protein (%) | Wort Protein (%) | S/T (%) | DP (°ASBC) | Alpha-amylase (20°DU) | Beta-glucan (ppm) | Quality Score | Overall Rank |
|---------|----------------------|----------|-------|--------------------|----------|-----------------------|------------------|------------|--------------|--------------------|------------------|---------|------------|-----------------------|-------------------|---------------|--------------|
| 4055    | BEACON               | Fargo    | 6     | 26.4               | 30.0     | 59                    | 76.1             | 2.2        | 1            | 15.0               | 6.44             | 45.0    | 157        | 81.7                  | 37                | 14            | 339          |
| 4056    | BH57                 | Fargo    | 6     | 27.8               | 18.9     | 55                    | 74.6             | 2.0        | 1            | 13.4               | 5.60             | 44.0    | 143        | 61.7                  | 116               | 29            | 105          |
| 4057    | HAZEN                | Fargo    | 6     | 28.3               | 49.1     | 59                    | 77.8             | 2.3        | 1            | 14.1               | 6.02             | 44.3    | 142        | 74.3                  | 95                | 23            | 208          |
| 4058    | BH58                 | Fargo    | 6     | 28.1               | 45.3     | 55                    | 75.0             | 2.0        | 1            | 13.7               | 5.61             | 43.8    | 118        | 72.0                  | 236               | 20            | 266          |
| 4059    | MOREX                | Fargo    | 6     | 27.2               | 46.2     | 60                    | 75.9             | 2.1        | 1            | 13.8               | 5.72             | 43.3    | 154        | 75.4                  | 245               | 25            | 173          |
| 4060    | BH59                 | Fargo    | 6     | 27.4               | 38.0     | 57                    | 73.4             | 2.6        | 2            | 13.4               | 5.76             | 44.9    | 135        | 73.5                  | 169               | 21            | 240          |
| 4061    | BH60                 | Fargo    | 6     | 27.8               | 44.5     | 64                    | 74.1             | 2.2        | 1            | 13.3               | 5.49             | 43.8    | 125        | 73.8                  | 237               | 18            | 303          |
| 4062    | BH61                 | Fargo    | 6     | 26.6               | 36.9     | 58                    | 74.0             | 2.4        | 1            | 14.1               | 5.73             | 42.4    | 147        | 76.7                  | 145               | 24            | 191          |
| 4063    | BH62                 | Fargo    | 6     | 26.7               | 19.9     | 60                    | 74.7             | 2.0        | 1            | 13.0               | 5.19             | 41.3    | 175        | 61.0                  | 57                | 22            | 222          |
| 4064    | BH63                 | Fargo    | 6     | 29.4               | 44.4     | 58                    | 75.2             | 2.1        | 1            | 14.1               | 5.38             | 39.7    | 137        | 67.3                  | 204               | 14            | 339          |
| 4066    | BH64                 | Fargo    | 6     | 29.0               | 47.5     | 58                    | 73.9             | 2.3        | 1            | 14.1               | 5.93             | 44.5    | 162        | 75.3                  | 226               | 19            | 286          |
| 4067    | BH65                 | Fargo    | 6     | 27.2               | 22.7     | 58                    | 74.6             | 2.3        | 2            | 13.7               | 5.73             | 43.4    | 160        | 70.3                  | 110               | 28            | 118          |
| 4068    | BH66                 | Fargo    | 6     | 29.4               | 42.1     | 52                    | 75.2             | 2.6        | 2            | 13.3               | 5.93             | 45.8    | 158        | 67.3                  | 97                | 30            | 87           |
| 4069    | BH67                 | Fargo    | 6     | 27.7               | 21.3     | 57                    | 73.7             | 2.5        | 2            | 13.8               | 5.49             | 41.4    | 147        | 64.9                  | 78                | 24            | 191          |
| 4070    | BH68                 | Fargo    | 6     | 28.0               | 34.1     | 60                    | 74.6             | *2.9       | 2            | 13.1               | 5.38             | 43.1    | 124        | 69.5                  | 177               | 17            | 313          |
| 4071    | BH69                 | Fargo    | 6     | 27.8               | 29.2     | 57                    | 73.6             | *2.9       | 2            | 13.6               | 6.00             | 46.3    | 174        | 79.5                  | 81                | 13            | 349          |
| 4072    | BH70                 | Fargo    | 6     | 28.1               | 27.7     | 61                    | 74.4             | 2.4        | 1            | 13.1               | 6.40             | 50.5    | 146        | 83.5                  | 139               | 23            | 208          |
| 4073    | BH71                 | Fargo    | 6     | 28.8               | 21.7     | 61                    | 74.4             | 2.3        | 1            | 12.4               | 5.65             | 49.1    | 128        | 66.5                  | 155               | 20            | 266          |
| 4074    | BH72                 | Fargo    | 6     | 28.6               | 51.4     | 61                    | 75.8             | 1.9        | 1            | 13.1               | 5.37             | 42.2    | 117        | 67.4                  | 371               | 17            | 313          |
| 4075    | BH73                 | Fargo    | 6     | 27.3               | 34.2     | 60                    | 75.0             | 2.0        | 1            | 12.9               | 5.69             | 47.2    | 128        | 70.3                  | 213               | 13            | 349          |
| 4076    | BH74                 | Fargo    | 6     | 29.8               | 40.7     | 64                    | 77.1             | 1.9        | 1            | 13.4               | 5.66             | 43.2    | 122        | 62.1                  | 268               | 20            | 266          |
| 4077    | BH75                 | Fargo    | 6     | 29.8               | 39.7     | 58                    | 76.3             | 2.1        | 1            | 13.0               | 5.82             | 45.5    | 122        | 64.3                  | 265               | 20            | 266          |
| 4078    | BH76                 | Fargo    | 6     | 29.2               | 31.4     | 51                    | 75.4             | 2.2        | 1            | 14.1               | 6.32             | 47.7    | 141        | 63.3                  | 361               | 11            | 356          |
| 4079    | BH77                 | Fargo    | 6     | 30.2               | 39.8     | 60                    | 74.5             | 1.9        | 1            | 13.9               | 5.85             | 43.9    | 119        | 59.7                  | 343               | 23            | 208          |
| 4080    | BH78                 | Fargo    | 6     | 26.8               | 21.7     | 55                    | 74.7             | 2.1        | 1            | 13.8               | 5.85             | 42.7    | 139        | 58.3                  | 200               | 26            | 146          |
| 4081    | BH79                 | Fargo    | 6     | 28.4               | 35.6     | 60                    | 77.7             | 2.0        | 1            | 13.8               | 6.44             | 49.0    | 128        | 68.3                  | 295               | 12            | 352          |
| 4082    | BH80                 | Fargo    | 6     | 29.5               | 38.7     | 62                    | 73.3             | 1.9        | 1            | 13.0               | 5.47             | 44.4    | 139        | 57.1                  | 207               | 28            | 118          |
| 4083    | BH81                 | Fargo    | 6     | 28.3               | 45.0     | 60                    | 75.3             | 1.9        | 1            | 13.0               | 5.50             | 44.3    | 107        | 57.3                  | 194               | 24            | 191          |
| 4084    | BH82                 | Fargo    | 6     | 28.2               | 32.7     | 63                    | 75.2             | 1.9        | 1            | 13.1               | 5.62             | 45.3    | 111        | 58.9                  | 251               | 24            | 191          |
| 4086    | BH83                 | Fargo    | 6     | 31.4               | 64.1     | 55                    | 76.2             | 2.2        | 1            | 13.1               | 5.97             | 47.6    | 104        | 68.2                  | 353               | 14            | 339          |

Table 59

| Lab No. | Variety or Selection | Location | Rowed | Kernel Weight (mg) | on 6/64" | Barley Color (Agtron) | Malt Extract (%) | Wort Color | Wort Clarity | Barley Protein (%) | Wort Protein (%) | S/T (%) | DP (°ASBC) | Alpha-amylase (20°DU) | Beta-glucan (ppm) | Quality Score | Overall Rank |
|---------|----------------------|----------|-------|--------------------|----------|-----------------------|------------------|------------|--------------|--------------------|------------------|---------|------------|-----------------------|-------------------|---------------|--------------|
| 4087    | BH84                 | Fargo    | 6     | 27.8               | 19.3     | 60                    | 74.1             | 2.0        | 1            | 13.1               | 5.88             | 45.5    | 127        | 57.6                  | 181               | 22            | 222          |
| 4088    | BH85                 | Fargo    | 6     | 27.6               | 26.5     | 59                    | 74.9             | 2.0        | 1            | 14.0               | 6.02             | 44.7    | 130        | 71.3                  | 396               | 12            | 352          |
| 4089    | BH86                 | Fargo    | 6     | 28.9               | 48.9     | 60                    | 74.0             | 2.0        | 1            | 13.6               | 5.84             | 43.9    | 97         | 64.3                  | *418              | 17            | 313          |
| 4090    | BH87                 | Fargo    | 6     | 28.1               | 30.3     | 62                    | 74.5             | 1.9        | 1            | 13.7               | 5.75             | 42.6    | 122        | 61.1                  | 237               | 20            | 266          |
| 4091    | BH88                 | Fargo    | 6     | 28.4               | 22.6     | 61                    | 74.1             | 2.1        | 1            | 13.9               | 5.84             | 43.6    | 145        | 66.9                  | 269               | 27            | 131          |
| 4092    | BH89                 | Fargo    | 6     | 29.1               | 35.6     | 55                    | 73.8             | 2.2        | 1            | 13.5               | 5.87             | 46.1    | 144        | 59.1                  | 202               | 26            | 146          |
| 4093    | BH90                 | Fargo    | 6     | 28.4               | 37.0     | 60                    | 74.7             | 2.2        | 1            | 13.9               | 6.24             | 46.8    | 150        | 69.0                  | 245               | 19            | 286          |
| 4094    | BH91                 | Fargo    | 6     | 29.3               | 53.8     | 57                    | 74.8             | 2.2        | 1            | 13.7               | 5.94             | 45.2    | 119        | 70.3                  | *457              | 17            | 313          |
| 4095    | BH92                 | Fargo    | 6     | 30.1               | 50.5     | 52                    | 73.7             | 2.1        | 1            | 13.7               | 5.79             | 44.0    | 115        | 62.8                  | 325               | 19            | 286          |
| 4096    | BH93                 | Fargo    | 6     | 30.0               | 39.4     | 54                    | 76.1             | 2.2        | 1            | 12.4               | 5.82             | 47.7    | 114        | 63.9                  | 157               | 22            | 222          |
| 4097    | BH94                 | Fargo    | 6     | 28.3               | 32.0     | 58                    | 74.6             | 1.9        | 1            | 13.2               | 5.45             | 43.2    | 126        | 61.5                  | 184               | 20            | 266          |
| 4098    | BH95                 | Fargo    | 6     | 30.2               | 33.2     | 58                    | 74.3             | 2.1        | 1            | 13.4               | 5.57             | 43.2    | 117        | 58.2                  | 181               | 26            | 146          |
| 4099    | BH96                 | Fargo    | 6     | 27.6               | 24.9     | 55                    | 73.7             | 2.5        | 1            | 13.4               | 5.92             | 45.1    | 133        | 63.9                  | 126               | 26            | 146          |
| 4100    | BH97                 | Fargo    | 6     | 28.2               | 49.2     | 45                    | 75.5             | 2.8        | 1            | 13.8               | 6.94             | 52.3    | 130        | 74.8                  | 261               | 12            | 352          |
| 4101    | BH98                 | Fargo    | 6     | 27.6               | 41.8     | 65                    | 73.9             | 2.0        | 1            | 13.4               | 5.72             | 43.3    | 127        | 63.5                  | 352               | 15            | 334          |
| 4102    | MOREX                | Fargo    | 6     | 25.9               | 27.0     | 52                    | 75.9             | 2.6        | 1            | 13.1               | 6.81             | *54.1   | 142        | 80.5                  | 128               | 21            | 240          |
| 4103    | BH99                 | Fargo    | 6     | 28.3               | 35.9     | 59                    | 74.6             | 2.1        | 1            | 13.3               | 5.75             | 44.7    | 130        | 68.1                  | 283               | 20            | 266          |
| 4104    | BH100                | Fargo    | 6     | 30.2               | 37.8     | 62                    | 74.8             | 2.0        | 1            | 13.0               | 5.51             | 43.1    | 137        | 60.0                  | 377               | 23            | 208          |
| 4105    | BH101                | Fargo    | 6     | 27.5               | 27.3     | 64                    | 74.2             | 2.1        | 1            | 13.7               | 6.11             | 47.2    | 146        | 74.2                  | 263               | 17            | 313          |
| 4107    | BH102                | Fargo    | 6     | 29.9               | 35.4     | 61                    | 75.4             | 2.0        | 1            | 13.9               | 5.71             | 42.0    | 115        | 59.8                  | 224               | 24            | 191          |
| 4108    | BH103                | Fargo    | 6     | 28.2               | 37.7     | 63                    | 73.9             | 2.2        | 1            | 14.4               | 6.18             | 44.5    | 152        | 74.6                  | 368               | 16            | 326          |
| 4109    | BH104                | Fargo    | 6     | 28.0               | 47.2     | 57                    | 75.2             | 1.9        | 1            | 13.7               | 5.67             | 43.0    | 130        | 69.4                  | 267               | 24            | 191          |
| 4110    | HAZEN                | Fargo    | 6     | 29.1               | 53.5     | 59                    | 77.8             | 2.5        | 1            | 13.7               | 6.31             | 49.2    | 141        | 69.8                  | 157               | 19            | 286          |
| 4111    | FOSTER               | Fargo    | 6     | 27.8               | 46.6     | 45                    | 77.0             | 2.8        | 1            | 13.0               | 6.82             | *54.0   | 136        | 79.0                  | 195               | 14            | 339          |
| 4112    | BEACON               | Fargo    | 6     | 26.3               | 26.4     | 60                    | 75.5             | 2.0        | 1            | 14.8               | 6.58             | 44.9    | 167        | 80.6                  | 46                | 14            | 339          |
| 4113    | BH105                | Fargo    | 6     | 30.7               | 37.2     | 55                    | 74.9             | 2.4        | 1            | 13.8               | 6.18             | 46.3    | 148        | 77.5                  | 184               | 21            | 240          |
| 4114    | BH107                | Fargo    | 6     | 27.5               | 28.9     | 67                    | 74.1             | 1.9        | 1            | 13.7               | 5.47             | 41.7    | 126        | 64.3                  | 176               | 18            | 303          |
| 4115    | BH108                | Fargo    | 6     | 28.8               | 24.8     | 58                    | 75.7             | 1.8        | 1            | 13.2               | 5.37             | 42.6    | 105        | 61.2                  | 202               | 20            | 266          |
| 4116    | BH109                | Fargo    | 6     | 28.3               | 25.6     | 65                    | 75.2             | 2.1        | 1            | 13.2               | 5.89             | 45.4    | 145        | 69.7                  | 92                | 31            | 80           |
| 4117    | BH110                | Fargo    | 6     | 28.3               | 23.8     | 60                    | 74.6             | 1.7        | 1            | 13.2               | 5.42             | 42.4    | 148        | 59.1                  | 110               | 35            | 38           |

Table 59

| Lab No. | Variety or Selection | Location | Rowed | Kernel Weight (mg) | on 6/64" | Barley Color (Agtron) | Malt Extract (%) | Wort Color | Wort Clarity | Barley Protein (%) | Wort Protein (%) | S/T (%) | DP (°ASBC) | Alpha-amylase (20°DU) | Beta-glucan (ppm) | Quality Score | Overall Rank |
|---------|----------------------|----------|-------|--------------------|----------|-----------------------|------------------|------------|--------------|--------------------|------------------|---------|------------|-----------------------|-------------------|---------------|--------------|
| 4118    | BH111                | Fargo    | 6     | 30.5               | 41.6     | 60                    | 74.5             | 2.0        | 1            | 12.5               | 5.43             | 46.7    | 136        | 64.1                  | 121               | 25            | 173          |
| 4119    | BH112                | Fargo    | 6     | 27.8               | 28.3     | 62                    | 74.7             | 1.8        | 1            | 13.4               | 5.93             | 44.6    | 137        | 72.1                  | 151               | 22            | 222          |
| 4120    | BH113                | Fargo    | 6     | 27.3               | 19.4     | 64                    | 75.5             | 2.0        | 1            | 12.9               | 5.37             | 43.2    | 127        | 62.6                  | 98                | 22            | 222          |
| 4121    | BH114                | Fargo    | 6     | 26.8               | 19.2     | 62                    | 76.1             | 1.9        | 1            | 12.9               | 5.36             | 43.9    | 122        | 65.6                  | 118               | 22            | 222          |
| 4122    | BH115                | Fargo    | 6     | 28.6               | 21.5     | 55                    | 75.7             | 2.2        | 1            | 13.2               | 6.01             | 46.5    | 140        | 70.6                  | 91                | 23            | 208          |
| 4123    | BH116                | Fargo    | 6     | 28.5               | 35.2     | 60                    | 75.6             | 2.1        | 1            | 13.7               | 6.21             | 47.9    | 143        | 75.8                  | 152               | 19            | 286          |
| 4124    | BH117                | Fargo    | 6     | 27.2               | 15.7     | 62                    | 74.9             | 2.1        | 1            | 13.1               | 5.82             | 47.6    | 125        | 66.2                  | 100               | 17            | 313          |
| 4125    | BH118                | Fargo    | 6     | 27.6               | 24.1     | 56                    | 75.2             | 2.0        | 1            | 13.1               | 5.59             | 44.3    | 137        | 66.1                  | 104               | 26            | 146          |
| 4126    | BH119                | Fargo    | 6     | 27.3               | 22.3     | 70                    | 73.4             | 1.8        | 1            | 13.1               | 5.47             | 43.6    | 123        | 66.3                  | 201               | 18            | 303          |
| 4127    | BH120                | Fargo    | 6     | 26.9               | 22.2     | 66                    | 73.9             | 1.9        | 1            | 13.4               | 5.59             | 43.6    | 146        | 62.6                  | 125               | 29            | 105          |
| 4128    | BH121                | Fargo    | 6     | 27.5               | 24.1     | 62                    | 74.6             | 1.8        | 1            | 13.9               | 5.55             | 42.6    | 134        | 57.5                  | 114               | 30            | 87           |
| 4130    | BH122                | Fargo    | 6     | 31.5               | 43.4     | 64                    | 77.5             | 1.9        | 1            | 12.9               | 5.88             | 49.3    | 120        | 72.5                  | 216               | 17            | 313          |
| 4131    | BH123                | Fargo    | 6     | 30.5               | 48.3     | 60                    | 76.0             | 2.4        | 1            | 13.5               | 6.34             | 50.5    | 124        | *89.2                 | 173               | 14            | 339          |
| 4132    | BH124                | Fargo    | 6     | 29.1               | 26.8     | 60                    | 74.7             | 2.2        | 1            | 12.6               | 5.78             | 48.3    | 137        | 74.9                  | 69                | 19            | 286          |
| 4133    | BH125                | Fargo    | 6     | 29.4               | 48.4     | 57                    | 74.9             | 2.1        | 1            | 13.4               | 5.81             | 44.4    | 149        | 75.4                  | 152               | 27            | 131          |
| 4134    | BH126                | Fargo    | 6     | 29.4               | 49.7     | 58                    | 76.0             | 2.3        | 1            | 12.7               | 5.86             | 49.5    | 125        | 69.0                  | 110               | 19            | 286          |
| 4135    | BH127                | Fargo    | 6     | 28.1               | 35.7     | 61                    | 74.4             | 2.2        | 1            | 13.7               | 6.31             | 47.4    | 159        | 80.3                  | 104               | 23            | 208          |
| 4136    | BH128                | Fargo    | 6     | 28.6               | 26.8     | 58                    | 76.1             | 2.0        | 1            | 13.0               | 5.69             | 45.8    | 133        | 67.3                  | 96                | 28            | 118          |
| 4137    | BH129                | Fargo    | 6     | 27.7               | 31.5     | 57                    | 74.0             | 1.9        | 1            | 13.2               | 5.62             | 44.2    | 120        | 68.3                  | 131               | 22            | 222          |
| 4138    | BH130                | Fargo    | 6     | 27.9               | 35.7     | 62                    | 74.5             | 2.0        | 1            | 13.6               | 6.14             | 47.0    | 140        | 85.4                  | 161               | 17            | 313          |
| 4139    | BH132                | Fargo    | 6     | 27.6               | 17.8     | 59                    | 74.6             | 2.2        | 1            | 14.2               | 6.12             | 46.3    | 149        | 65.4                  | 128               | 16            | 326          |
| 4140    | BH133                | Fargo    | 6     | 29.0               | 31.5     | 55                    | 75.0             | 2.0        | 1            | 13.2               | 5.44             | 43.3    | 119        | 61.5                  | 169               | 20            | 266          |
| 4141    | BH134                | Fargo    | 6     | 28.8               | 30.9     | 58                    | 75.2             | 1.8        | 1            | 12.6               | 5.32             | 42.3    | 118        | 59.9                  | 217               | 24            | 191          |
| 4142    | BH135                | Fargo    | 6     | 29.4               | 33.3     | 62                    | 75.0             | 2.1        | 1            | 13.6               | 6.01             | 44.7    | 154        | 71.8                  | 107               | 28            | 118          |
| 4143    | BH136                | Fargo    | 6     | 27.5               | 24.5     | 68                    | 73.6             | 2.0        | 1            | 13.7               | 5.86             | 43.5    | 132        | 76.4                  | 188               | 22            | 222          |
| 4144    | BH137                | Fargo    | 6     | 26.9               | 19.1     | 71                    | 73.3             | 2.1        | 1            | 13.4               | 6.10             | 47.7    | 116        | 83.9                  | 207               | 10            | 358          |
| 4145    | BH138                | Fargo    | 6     | 29.0               | 22.8     | 63                    | 74.1             | 2.0        | 1            | 13.4               | 5.90             | 44.7    | 105        | 72.4                  | 263               | 20            | 266          |
| 4146    | BH139                | Fargo    | 6     | 27.2               | 20.4     | 63                    | 74.4             | 1.8        | 1            | 13.3               | 5.76             | 44.2    | 146        | 69.6                  | 155               | 25            | 173          |
| 4147    | BH140                | Fargo    | 6     | 27.5               | 12.6     | 67                    | 72.9             | 2.1        | 1            | 14.2               | 6.20             | 44.3    | 160        | 77.7                  | 107               | 21            | 240          |
| 4148    | BH141                | Fargo    | 6     | 29.6               | 35.3     | 63                    | 74.4             | 2.2        | 1            | 13.7               | 6.21             | 46.6    | 134        | 75.9                  | 160               | 16            | 326          |

Table 59

| Lab No. | Variety or Selection | Location | Rowed | Kernel | on    | Barley | Malt    |            | Barley       | Wort    |             | S/T  | DP   | Alpha-  | Beta-           | Quality      | Overall |
|---------|----------------------|----------|-------|--------|-------|--------|---------|------------|--------------|---------|-------------|------|------|---------|-----------------|--------------|---------|
|         |                      |          |       | Weight | 6/64" | Color  | Extract | Wort Color | Wort Clarity | Protein | Protein (%) |      |      | (°ASBC) | amylase (20°DU) | glucan (ppm) | Score   |
| 4150    | BH142                | Fargo    | 6     | 27.2   | 27.5  | 61     | 74.0    | 2.1        | 1            | 13.3    | 6.02        | 45.7 | 129  | 73.1    | 90              | 19           | 286     |
| 4151    | HAZEN                | Fargo    | 6     | 27.7   | 40.3  | 60     | 76.2    | 2.2        | 1            | 13.7    | 6.29        | 48.1 | 145  | 78.2    | 91              | 21           | 240     |
| 4152    | BH143                | Fargo    | 6     | 27.5   | 36.6  | 60     | 74.9    | 1.9        | 1            | 13.5    | 5.58        | 43.1 | 117  | 70.0    | 138             | 22           | 222     |
| 4153    | BH144                | Fargo    | 6     | 27.4   | 29.9  | 60     | 74.8    | 1.8        | 1            | 13.4    | 5.62        | 42.5 | 123  | 59.2    | 99              | 26           | 146     |
| 4154    | BH145                | Fargo    | 6     | 27.9   | 26.2  | 61     | 73.9    | 2.2        | 1            | 13.7    | 6.10        | 46.8 | 146  | 77.1    | 94              | 21           | 240     |
| 4155    | BH146                | Fargo    | 6     | 27.7   | 23.0  | 63     | 74.1    | 2.2        | 1            | 14.3    | 6.26        | 46.6 | 126  | 80.7    | 163             | 5            | 362     |
| 4156    | FOSTER               | Fargo    | 6     | 25.6   | 15.9  | 64     | 74.5    | 2.2        | 1            | 13.4    | 6.07        | 45.6 | 162  | 81.1    | 69              | 19           | 286     |
| 4157    | BH148                | Fargo    | 6     | 26.4   | 23.2  | 56     | 74.4    | 2.1        | 1            | 14.3    | 5.78        | 41.9 | 166  | 64.9    | 118             | 21           | 240     |
| 4158    | MOREX                | Fargo    | 6     | 25.6   | 27.9  | 53     | 76.9    | 2.6        | 1            | 14.1    | 6.76        | 50.1 | 142  | 86.1    | 65              | 12           | 352     |
| 4159    | MOREX                | Fargo    | 6     | 26.3   | 33.6  | 50     | 76.1    | 2.6        | 1            | 14.0    | 6.80        | 49.4 | 155  | *92.6   | 83              | 16           | 326     |
| 4160    | BH151                | Fargo    | 6     | 27.2   | 26.0  | 63     | 74.6    | 2.1        | 1            | 14.4    | 6.17        | 45.6 | *188 | 61.6    | 48              | 10           | 358     |
| 4161    | BEACON               | Fargo    | 6     | 27.9   | 35.0  | 60     | 76.5    | 2.0        | 1            | 14.9    | 6.60        | 45.1 | 172  | 77.3    | 65              | 10           | 358     |
| 4162    | BH152                | Fargo    | 6     | 29.1   | 33.6  | 48     | 76.4    | 2.5        | 1            | 13.5    | 6.31        | 47.2 | 139  | 70.0    | 121             | 20           | 266     |
| 4163    | BH154                | Fargo    | 6     | 27.9   | 29.9  | 56     | 75.2    | 2.3        | 1            | 13.7    | 5.96        | 46.2 | 162  | 63.5    | 173             | 17           | 313     |
| 4164    | BH155                | Fargo    | 6     | 28.3   | 29.6  | 65     | 74.4    | 2.0        | 1            | 13.1    | 5.38        | 41.4 | 107  | 55.8    | 257             | 24           | 191     |
| 4165    | BH156                | Fargo    | 6     | 27.3   | 20.8  | 62     | 74.5    | 2.0        | 1            | 13.4    | 5.99        | 46.6 | 134  | 60.2    | 117             | 21           | 240     |
| 4166    | BH157                | Fargo    | 6     | 26.6   | 23.0  | 60     | 75.0    | 2.0        | 1            | 13.2    | 5.47        | 43.1 | 140  | 58.3    | 129             | 33           | 59      |
| 4167    | BH158                | Fargo    | 6     | 29.3   | 39.6  | 57     | 74.5    | 2.1        | 1            | 13.6    | 5.75        | 43.3 | 125  | 64.7    | 244             | 20           | 266     |
| 4168    | BH159                | Fargo    | 6     | 28.5   | 41.7  | 51     | 75.7    | 2.2        | 1            | 13.8    | 6.05        | 47.1 | 150  | 64.5    | 197             | 19           | 286     |
| 4169    | BH160                | Fargo    | 6     | 27.7   | 29.0  | 58     | 75.8    | 2.2        | 1            | 13.2    | 5.96        | 45.5 | 151  | 64.5    | 210             | 25           | 173     |
| 4170    | BH161                | Fargo    | 6     | 27.6   | 31.0  | 61     | 75.3    | 2.0        | 1            | 13.7    | 6.05        | 45.4 | 162  | 71.8    | 237             | 19           | 286     |
| 4172    | BH162                | Fargo    | 6     | 28.6   | 42.8  | 58     | 75.9    | 2.0        | 1            | 13.3    | 5.67        | 43.7 | 131  | 64.2    | 333             | 21           | 240     |
| 4173    | BH163                | Fargo    | 6     | 29.4   | 44.0  | 58     | 75.8    | 2.0        | 1            | 13.1    | 5.38        | 42.2 | 121  | 58.1    | 359             | 21           | 240     |
| 4174    | BH164                | Fargo    | 6     | 27.4   | 16.8  | 66     | 75.3    | 1.8        | 1            | 12.9    | 5.11        | 40.9 | 130  | 51.2    | 159             | 29           | 105     |
| 4175    | BH165                | Fargo    | 6     | 28.5   | 38.8  | 61     | 76.5    | 2.0        | 1            | 12.0    | 5.56        | 47.6 | 123  | 63.1    | 286             | 20           | 266     |
| 4176    | BH166                | Fargo    | 6     | 26.7   | 33.2  | 62     | 76.7    | 1.8        | 1            | 13.6    | 5.30        | 41.2 | 121  | 60.1    | 273             | 22           | 222     |
| 4177    | BH167                | Fargo    | 6     | 29.7   | 29.6  | 56     | 76.0    | 1.9        | 1            | 12.3    | 5.02        | 42.2 | 93   | 56.6    | 173             | 33           | 59      |
| 4178    | BH168                | Fargo    | 6     | 27.3   | 32.5  | 60     | 76.8    | 1.9        | 1            | 14.5    | 6.31        | 44.8 | 155  | 69.6    | 44              | 17           | 313     |
| 4179    | BH169                | Fargo    | 6     | 29.0   | 42.0  | 49     | 75.7    | 2.1        | 1            | 13.5    | 5.89        | 45.4 | 150  | 65.8    | 231             | 27           | 131     |
| 4180    | BH170                | Fargo    | 6     | 30.2   | 54.5  | 57     | 76.1    | 2.1        | 1            | 14.2    | 6.30        | 46.9 | 132  | 67.0    | 269             | 13           | 349     |

Table 59

| Lab No. | Variety or Selection | Location | Rowed | Kernel | on    | Barley | Malt    | Barley     | Wort         | Alpha-      | Beta-       | Overall |         |            |                 |              |               |
|---------|----------------------|----------|-------|--------|-------|--------|---------|------------|--------------|-------------|-------------|---------|---------|------------|-----------------|--------------|---------------|
|         |                      |          |       | Weight | 6/64" | Color  | Extract | Wort Color | Wort Clarity | Protein (%) | Protein (%) |         | S/T (%) | DP (°ASBC) | amylase (20°DU) | glucan (ppm) | Quality Score |
| 4181    | BH171                | Fargo    | 6     | 29.5   | 36.3  | 56     | 76.1    | 2.1        | 1            | 13.7        | 5.94        | 45.7    | 149     | 65.5       | 207             | 27           | 131           |
| 4182    | BH1                  | Prosper  | 6     | 30.2   | 65.6  | 53     | 78.4    | 1.9        | 1            | 12.7        | 5.70        | 45.6    | 121     | 66.3       | 244             | 26           | 146           |
| 4183    | BH2                  | Prosper  | 6     | 33.5   | 69.3  | 48     | 79.8    | 2.0        | 1            | 13.6        | 5.99        | 46.6    | 133     | 64.3       | 257             | 29           | 105           |
| 4184    | MOREX                | Prosper  | 6     | 28.8   | 59.8  | 50     | 78.9    | 2.5        | 1            | 14.9        | 6.93        | 49.2    | 153     | 67.6       | 128             | 25           | 173           |
| 4185    | BH3                  | Prosper  | 6     | 32.5   | 70.3  | 43     | 78.5    | 2.3        | 1            | 13.9        | 6.37        | 45.9    | 129     | 64.8       | 156             | 27           | 131           |
| 4186    | BH4                  | Prosper  | 6     | 33.5   | 72.1  | 39     | 76.7    | 2.4        | 1            | 14.7        | 6.47        | 45.4    | 126     | 62.7       | 359             | 15           | 334           |
| 4187    | BH5                  | Prosper  | 6     | 32.7   | 65.5  | 43     | 77.1    | 2.6        | 1            | 14.2        | 6.60        | 49.1    | 138     | 63.8       | 196             | 14           | 339           |
| 4188    | BEACON               | Prosper  | 6     | 30.0   | 60.4  | 47     | 78.3    | 2.1        | 1            | 15.0        | 6.38        | 44.9    | 156     | 64.2       | 59              | 23           | 208           |
| 4189    | BH6                  | Prosper  | 6     | 31.8   | 55.1  | 46     | 76.8    | 2.2        | 1            | 14.0        | 5.94        | 45.5    | 134     | 60.9       | 185             | 21           | 240           |
| 4190    | HAZEN                | Prosper  | 6     | 31.3   | 67.8  | 55     | 79.8    | 2.1        | 1            | 13.4        | 6.14        | 47.8    | 128     | 69.5       | 175             | 21           | 240           |
| 4192    | BH8                  | Prosper  | 6     | 33.6   | 70.9  | 44     | 77.9    | 2.1        | 1            | 14.1        | 5.97        | 43.2    | 145     | 63.4       | 158             | 28           | 118           |
| 4193    | FOSTER               | Prosper  | 6     | 33.6   | 80.7  | 46     | 79.4    | 2.3        | 1            | 12.7        | 6.39        | 52.8    | 122     | 72.8       | 292             | 27           | 131           |
| 4194    | BH9                  | Prosper  | 6     | 33.3   | 65.7  | 45     | 78.0    | 2.1        | 1            | 12.8        | 5.50        | 44.3    | 115     | 57.3       | 173             | 31           | 80            |
| 4195    | BH10                 | Prosper  | 6     | 35.2   | 72.6  | 54     | 78.1    | 2.0        | 1            | 13.0        | 5.75        | 44.3    | 127     | 56.6       | 311             | 31           | 80            |
| 4196    | BH11                 | Prosper  | 6     | 32.0   | 74.6  | 53     | 78.6    | 2.1        | 1            | 13.0        | 5.84        | 45.8    | 110     | 64.6       | 242             | 30           | 87            |
| 4197    | BH12                 | Prosper  | 6     | 31.5   | 55.7  | 55     | 77.7    | 1.9        | 1            | 13.5        | 5.58        | 43.9    | 141     | 57.2       | 73              | 33           | 59            |
| 4198    | BH13                 | Prosper  | 6     | 32.1   | 74.5  | 49     | 78.6    | 1.8        | 1            | 13.6        | 5.31        | 41.5    | 105     | 56.9       | *429            | 31           | 80            |
| 4199    | BH14                 | Prosper  | 6     | 33.5   | 68.1  | 47     | 78.7    | 2.0        | 1            | 13.2        | 5.83        | 46.6    | 127     | 55.6       | 106             | 30           | 87            |
| 4200    | BH15                 | Prosper  | 6     | 31.1   | 63.3  | 53     | 78.8    | 2.0        | 1            | 12.3        | 5.68        | 48.7    | 134     | 58.4       | 70              | 34           | 45            |
| 4201    | BH16                 | Prosper  | 6     | 31.8   | 52.5  | 57     | 78.3    | 2.1        | 1            | 13.0        | 6.12        | 49.2    | 140     | 59.7       | 51              | 29           | 105           |
| 4202    | BH17                 | Prosper  | 6     | 29.3   | 36.0  | 56     | 77.3    | 2.2        | 1            | 12.7        | 6.23        | 50.7    | 123     | 68.8       | 82              | 16           | 326           |
| 4203    | BH18                 | Prosper  | 6     | 29.5   | 37.5  | 54     | 77.2    | 2.0        | 1            | 13.0        | 6.03        | 48.7    | 133     | 64.7       | 76              | 16           | 326           |
| 4204    | BH19                 | Prosper  | 6     | 32.6   | 71.7  | 51     | 79.1    | 1.9        | 1            | 12.9        | 5.78        | 47.3    | 135     | 58.0       | 114             | 40           | 14            |
| 4205    | BH20                 | Prosper  | 6     | 31.1   | 74.7  | 53     | 78.7    | 1.8        | 1            | 12.7        | 5.65        | 45.8    | 113     | 63.5       | 206             | 29           | 105           |
| 4206    | BH21                 | Prosper  | 6     | 33.0   | 64.4  | 55     | 79.5    | 1.9        | 1            | 12.6        | 5.79        | 47.6    | 118     | 53.3       | 74              | 32           | 67            |
| 4207    | BH22                 | Prosper  | 6     | 30.0   | 37.4  | 57     | 77.9    | 2.0        | 1            | 12.3        | 5.63        | 47.5    | 137     | 55.2       | 59              | 30           | 87            |
| 4208    | BH23                 | Prosper  | 6     | 34.6   | 79.2  | 53     | 78.7    | 2.2        | 1            | 14.1        | 6.37        | 46.9    | 137     | 71.4       | 152             | 23           | 208           |
| 4209    | BH24                 | Prosper  | 6     | 31.5   | 72.1  | 52     | 78.8    | 2.0        | 1            | 13.8        | 5.97        | 44.8    | 146     | 68.0       | 217             | 36           | 34            |
| 4210    | BH25                 | Prosper  | 6     | 32.0   | 57.8  | 45     | 78.8    | 2.2        | 1            | 13.8        | 6.03        | 46.1    | 132     | 59.5       | 64              | 27           | 131           |
| 4211    | BH26                 | Prosper  | 6     | 32.1   | 57.3  | 49     | 78.6    | 2.2        | 1            | 13.9        | 6.18        | 47.5    | 134     | 61.5       | 74              | 23           | 208           |

Table 59

| Lab No. | Variety or Selection | Location | Rowed | Kernel | on    | Barley | Malt    |            | Barley       | Wort    | Alpha-  |      | Beta- | Quality | Overall |       |      |
|---------|----------------------|----------|-------|--------|-------|--------|---------|------------|--------------|---------|---------|------|-------|---------|---------|-------|------|
|         |                      |          |       | Weight | 6/64" | Color  | Extract | Wort Color | Wort Clarity | Protein | Protein | S/T  | DP    | amylase | glucan  | Score | Rank |
| 4213    | BH27                 | Prosper  | 6     | 32.4   | 60.4  | 49     | 77.4    | 1.9        | 1            | 12.6    | 5.42    | 44.9 | 104   | 55.1    | 199     | 27    | 131  |
| 4214    | BH28                 | Prosper  | 6     | 31.9   | 56.5  | 49     | 78.5    | 1.9        | 1            | 13.0    | 5.68    | 46.9 | 147   | 58.6    | 163     | 32    | 67   |
| 4215    | BH29                 | Prosper  | 6     | 31.1   | 63.9  | 50     | 78.9    | 2.1        | 1            | 13.0    | 5.85    | 45.9 | 139   | 64.0    | 140     | 37    | 27   |
| 4216    | BH30                 | Prosper  | 6     | 32.6   | 59.9  | 52     | 77.8    | 2.0        | 1            | 12.4    | 5.35    | 44.0 | 118   | 56.7    | 166     | 32    | 67   |
| 4217    | BH31                 | Prosper  | 6     | 32.2   | 62.3  | 43     | 78.3    | 2.1        | 1            | 13.9    | 5.90    | 43.3 | 123   | 66.7    | 159     | 27    | 131  |
| 4218    | BH32                 | Prosper  | 6     | 31.8   | 61.6  | 47     | 78.3    | 2.5        | 1            | 13.6    | 6.17    | 46.2 | 140   | 67.9    | 105     | 29    | 105  |
| 4219    | BH33                 | Prosper  | 6     | 32.9   | 67.2  | 38     | 76.9    | 2.6        | 1            | 15.0    | 6.86    | 46.2 | 148   | 65.6    | 127     | 21    | 240  |
| 4220    | BH34                 | Prosper  | 6     | 33.0   | 69.4  | 43     | 78.6    | 2.1        | 1            | 14.3    | 6.13    | 44.0 | 120   | 60.0    | 284     | 19    | 286  |
| 4221    | BH35                 | Prosper  | 6     | 31.6   | 55.5  | 47     | 77.6    | 2.1        | 1            | 13.7    | 6.09    | 45.2 | 134   | 68.8    | 186     | 23    | 208  |
| 4222    | BH36                 | Prosper  | 6     | 32.7   | 59.2  | 43     | 77.4    | 2.2        | 1            | 14.4    | 6.14    | 45.2 | 135   | 65.7    | 168     | 19    | 286  |
| 4223    | BH37                 | Prosper  | 6     | 33.3   | 69.4  | 40     | 78.4    | 2.3        | 1            | *15.5   | 6.63    | 44.3 | 168   | 73.5    | 364     | 20    | 266  |
| 4224    | BH38                 | Prosper  | 6     | *37.0  | 69.8  | 41     | 77.8    | 2.5        | 1            | *15.6   | 6.83    | 45.0 | 139   | 65.8    | 125     | 23    | 208  |
| 4225    | BH39                 | Prosper  | 6     | 33.6   | 59.8  | 42     | 78.6    | 2.7        | 1            | 14.5    | 6.75    | 47.9 | 122   | 66.1    | 152     | 14    | 339  |
| 4226    | BH40                 | Prosper  | 6     | 32.1   | 65.8  | 42     | 77.2    | 2.4        | 1            | 14.5    | 6.55    | 47.0 | 148   | 69.7    | 104     | 21    | 240  |
| 4227    | BH41                 | Prosper  | 6     | 34.0   | 66.5  | 42     | 77.4    | 2.7        | 1            | 15.3    | 7.03    | 47.5 | 156   | 73.6    | 87      | 21    | 240  |
| 4228    | BH42                 | Prosper  | 6     | 33.8   | 75.8  | 41     | 80.1    | 2.5        | 1            | 13.5    | 6.17    | 48.8 | 92    | 65.5    | 118     | 32    | 67   |
| 4229    | BH43                 | Prosper  | 6     | 32.7   | 64.8  | 46     | 78.7    | 2.2        | 1            | 13.3    | 5.98    | 47.5 | 123   | 59.5    | 165     | 26    | 146  |
| 4230    | BH44                 | Prosper  | 6     | 33.4   | 73.8  | 51     | 78.8    | 2.0        | 1            | 13.4    | 5.67    | 45.5 | 118   | 68.3    | 201     | 30    | 87   |
| 4231    | BH45                 | Prosper  | 6     | 32.3   | 70.6  | 43     | 77.7    | 2.1        | 1            | 14.9    | 6.24    | 44.0 | 156   | 63.7    | 186     | 25    | 173  |
| 4233    | BH46                 | Prosper  | 6     | 30.5   | 51.4  | 42     | 78.1    | 2.2        | 1            | 13.7    | 6.07    | 45.3 | 151   | 74.1    | 116     | 34    | 45   |
| 4234    | BH47                 | Prosper  | 6     | 33.2   | 70.0  | 38     | 77.6    | 2.5        | 1            | 15.0    | 6.47    | 44.6 | 149   | 72.0    | 166     | 25    | 173  |
| 4235    | BH48                 | Prosper  | 6     | 32.4   | 55.0  | 35     | 78.2    | 2.3        | 1            | 14.5    | 6.36    | 46.0 | 148   | 67.2    | 90      | 30    | 87   |
| 4236    | BH49                 | Prosper  | 6     | 30.8   | 51.1  | 44     | 77.7    | 2.1        | 1            | 14.8    | 5.94    | 41.4 | 131   | 66.4    | 172     | 21    | 240  |
| 4237    | BH50                 | Prosper  | 6     | 30.8   | 55.9  | 50     | 77.4    | 2.0        | 1            | 13.5    | 5.95    | 46.9 | 142   | 71.8    | 226     | 24    | 191  |
| 4238    | BH51                 | Prosper  | 6     | 31.4   | 63.6  | 43     | 77.7    | 2.0        | 1            | 12.4    | 5.48    | 44.7 | 150   | 61.9    | 209     | 34    | 45   |
| 4239    | FOSTER               | Prosper  | 6     | 32.6   | 77.5  | 45     | 79.0    | 2.4        | 1            | 13.0    | 6.61    | 51.8 | 145   | 81.7    | 241     | 34    | 45   |
| 4240    | BH52                 | Prosper  | 6     | 34.2   | 73.3  | 50     | 77.6    | 2.1        | 1            | 13.7    | 5.74    | 42.9 | 134   | 66.2    | 135     | 34    | 45   |
| 4241    | BH53                 | Prosper  | 6     | 31.6   | 64.2  | 48     | 78.3    | 2.1        | 1            | 13.0    | 5.76    | 46.1 | 129   | 68.2    | 172     | 21    | 240  |
| 4242    | BH54                 | Prosper  | 6     | 34.7   | 77.2  | 49     | 78.2    | 2.0        | 1            | 14.1    | 6.17    | 46.3 | 171   | 72.2    | 177     | 19    | 286  |
| 4243    | BH55                 | Prosper  | 6     | 32.9   | 70.0  | 49     | 77.7    | 2.1        | 1            | 13.4    | 5.56    | 42.6 | 124   | 68.0    | 167     | 26    | 146  |

Table 59

| Lab No. | Variety or Selection | Location | Rowed | Kernel | on    | Barley | Malt    | Barley     | Wort         | Alpha-      | Beta-       | Overall |               |      |      |    |     |
|---------|----------------------|----------|-------|--------|-------|--------|---------|------------|--------------|-------------|-------------|---------|---------------|------|------|----|-----|
|         |                      |          |       | Weight | 6/64" | Color  | Extract | Wort Color | Wort Clarity | Protein (%) | Protein (%) |         | Quality Score | Rank |      |    |     |
| 4244    | BH56                 | Prosper  | 6     | 30.7   | 63.6  | 47     | 79.0    | 2.1        | 1            | 14.0        | 5.74        | 42.3    | 139           | 72.2 | 138  | 32 | 67  |
| 4245    | BEACON               | Prosper  | 6     | 30.7   | 66.0  | 50     | 79.4    | 1.9        | 1            | 14.4        | 6.32        | 46.3    | 164           | 72.2 | 20   | 17 | 313 |
| 4246    | BH57                 | Prosper  | 6     | 33.6   | 68.8  | 53     | 78.8    | 2.0        | 1            | 12.5        | 5.37        | 45.2    | 124           | 56.8 | 126  | 40 | 14  |
| 4247    | HAZEN                | Prosper  | 6     | 32.1   | 77.6  | 54     | 80.3    | 2.0        | 1            | 13.3        | 6.17        | 48.3    | 142           | 75.3 | 105  | 41 | 7   |
| 4248    | BH58                 | Prosper  | 6     | 32.3   | 74.7  | 42     | 78.5    | 2.0        | 1            | 13.1        | 5.68        | 44.7    | 110           | 71.3 | 297  | 30 | 87  |
| 4249    | MOREX                | Prosper  | 6     | 30.0   | 67.6  | 50     | 79.7    | 2.3        | 1            | 14.1        | 6.49        | 49.2    | 145           | 77.7 | 57   | 21 | 240 |
| 4250    | BH59                 | Prosper  | 6     | 32.7   | 75.5  | 50     | 77.9    | 2.2        | 1            | 13.0        | 5.63        | 45.4    | 114           | 69.5 | 229  | 26 | 146 |
| 4251    | BH60                 | Prosper  | 6     | 35.0   | 72.1  | 49     | 78.6    | 2.1        | 1            | 13.2        | 5.55        | 43.0    | 105           | 52.8 | 51   | 37 | 27  |
| 4252    | BH61                 | Prosper  | 6     | 30.4   | 65.3  | 51     | 78.8    | 2.1        | 1            | 12.9        | 5.74        | 46.9    | 130           | 70.5 | 76   | 25 | 173 |
| 4254    | BH62                 | Prosper  | 6     | 33.6   | 63.5  | 52     | 79.1    | 2.0        | 1            | 12.5        | 5.52        | 46.4    | 133           | 63.0 | 87   | 33 | 59  |
| 4255    | BH63                 | Prosper  | 6     | 32.0   | 87.9  | 44     | 79.9    | 2.1        | 1            | 13.1        | 5.60        | 45.3    | 124           | 55.1 | 94   | 42 | 5   |
| 4256    | BH64                 | Prosper  | 6     | 31.1   | 65.0  | 46     | 78.4    | 2.4        | 1            | 13.2        | 6.25        | 48.0    | 138           | 67.0 | 91   | 26 | 146 |
| 4257    | BH65                 | Prosper  | 6     | 30.5   | 56.8  | 46     | 78.7    | 2.3        | 1            | 13.1        | 5.82        | 47.7    | 126           | 65.3 | 28   | 18 | 303 |
| 4258    | BH66                 | Prosper  | 6     | 32.8   | 66.8  | 45     | 79.0    | 2.5        | 1            | 12.8        | 5.99        | 48.5    | 114           | 60.7 | 85   | 29 | 105 |
| 4259    | BH67                 | Prosper  | 6     | 32.8   | 62.7  | 48     | 78.8    | 2.2        | 1            | 12.8        | 5.66        | 47.9    | 115           | 52.8 | 36   | 26 | 146 |
| 4260    | BH68                 | Prosper  | 6     | 33.4   | 73.9  | 52     | 78.6    | 2.2        | 1            | 12.6        | 5.64        | 47.6    | 103           | 63.6 | 200  | 25 | 173 |
| 4261    | BH69                 | Prosper  | 6     | 30.4   | 56.3  | 49     | 77.9    | 2.3        | 1            | 13.6        | 5.93        | 46.2    | 155           | 64.0 | 92   | 28 | 118 |
| 4262    | BH70                 | Prosper  | 6     | 32.1   | 59.0  | 49     | 77.8    | 2.4        | 1            | 13.4        | 6.16        | 48.7    | 129           | 65.1 | 77   | 15 | 334 |
| 4263    | BH71                 | Prosper  | 6     | 35.1   | 69.1  | 50     | 79.7    | 2.1        | 1            | 12.7        | 5.60        | 45.0    | 106           | 61.6 | 270  | 30 | 87  |
| 4264    | BH72                 | Prosper  | 6     | 33.4   | 78.4  | 52     | 79.0    | 1.9        | 1            | 13.5        | 5.41        | 40.5    | 105           | 64.2 | *404 | 32 | 67  |
| 4265    | BH73                 | Prosper  | 6     | 30.5   | 59.9  | 50     | 79.1    | 2.1        | 1            | 12.5        | 5.45        | 45.4    | 113           | 66.0 | 133  | 38 | 23  |
| 4266    | BH74                 | Prosper  | 6     | 33.2   | 61.4  | 48     | 79.2    | 2.0        | 1            | 13.6        | 5.59        | 43.1    | 121           | 59.4 | 163  | 34 | 45  |
| 4267    | BH75                 | Prosper  | 6     | 34.0   | 72.1  | 47     | 79.8    | 2.4        | 1            | 13.2        | 6.16        | 47.2    | 118           | 69.1 | 152  | 25 | 173 |
| 4268    | BH76                 | Prosper  | 6     | 33.2   | 61.3  | 45     | 78.3    | 2.5        | 1            | 14.6        | 6.59        | 46.7    | 166           | 71.7 | 223  | 18 | 303 |
| 4269    | BH77                 | Prosper  | 6     | 32.9   | 61.6  | 43     | 77.8    | 2.5        | 1            | 13.8        | 6.17        | 45.9    | 133           | 67.2 | 124  | 28 | 118 |
| 4270    | BH78                 | Prosper  | 6     | 32.2   | 63.7  | 37     | 78.4    | 2.4        | 1            | 14.5        | 6.15        | 45.3    | 152           | 64.4 | 148  | 30 | 87  |
| 4271    | BH79                 | Prosper  | 6     | 32.3   | 68.0  | 42     | 79.6    | 2.2        | 1            | 14.6        | 6.36        | 46.2    | 148           | 71.3 | 109  | 28 | 118 |
| 4272    | BH80                 | Prosper  | 6     | 32.9   | 65.4  | 48     | 79.4    | 2.1        | 1            | 13.5        | 5.62        | 44.0    | 147           | 62.6 | 101  | 41 | 7   |
| 4273    | BH81                 | Prosper  | 6     | 31.8   | 62.8  | 46     | 78.7    | 2.3        | 2            | 13.4        | 5.61        | 43.9    | 101           | 54.5 | 83   | 36 | 34  |
| 4275    | BH82                 | Prosper  | 6     | 30.5   | 56.0  | 50     | 78.0    | 2.1        | 1            | 13.9        | 5.85        | 43.4    | 135           | 59.6 | 128  | 38 | 23  |

Table 59

| Lab No. | Variety or Selection | Location | Rowed | Kernel Weight (mg) | on 6/64" | Barley Color (Agtron) | Malt Extract (%) | Wort Color | Wort Clarity | Barley Protein (%) | Wort Protein (%) | S/T (%) | DP (°ASBC) | Alpha-amylase (20°DU) | Beta-glucan (ppm) | Quality Score | Overall Rank |
|---------|----------------------|----------|-------|--------------------|----------|-----------------------|------------------|------------|--------------|--------------------|------------------|---------|------------|-----------------------|-------------------|---------------|--------------|
| 4276    | BH83                 | Prosper  | 6     | 35.4               | 82.5     | 43                    | 79.5             | 2.3        | 1            | 13.6               | 6.55             | 48.6    | 117        | 67.5                  | 212               | 27            | 131          |
| 4277    | BH84                 | Prosper  | 6     | 32.5               | 63.2     | 42                    | 78.6             | 2.0        | 1            | 13.9               | 5.83             | 44.9    | 115        | 55.5                  | 70                | 31            | 80           |
| 4278    | BH85                 | Prosper  | 6     | 31.7               | 60.6     | 43                    | 77.5             | 2.2        | 1            | 15.2               | 6.08             | 41.0    | 139        | 70.2                  | 222               | 18            | 303          |
| 4279    | BH86                 | Prosper  | 6     | 32.7               | 78.7     | 50                    | 79.0             | 2.0        | 1            | 12.3               | 5.40             | 44.9    | 86         | 65.3                  | 243               | 40            | 14           |
| 4280    | BH87                 | Prosper  | 6     | 33.6               | 72.7     | 44                    | 78.5             | 2.2        | 1            | 12.7               | 5.58             | 46.4    | 112        | 64.1                  | 288               | 25            | 173          |
| 4281    | BH88                 | Prosper  | 6     | 32.8               | 69.1     | 53                    | 79.2             | 2.0        | 1            | 11.9               | 5.07             | 45.4    | 114        | 66.0                  | 252               | 39            | 21           |
| 4282    | BH89                 | Prosper  | 6     | 33.0               | 74.9     | 55                    | 79.4             | 2.1        | 1            | 12.2               | 5.25             | 46.0    | 117        | 59.5                  | 188               | 46            | 1            |
| 4283    | BH90                 | Prosper  | 6     | 32.0               | 77.5     | 49                    | 78.6             | 2.4        | 1            | 12.5               | 5.65             | 47.3    | 112        | 66.3                  | 226               | 32            | 67           |
| 4284    | BH91                 | Prosper  | 6     | 32.1               | 74.6     | 44                    | 78.4             | 2.2        | 1            | 13.9               | 5.80             | 44.7    | 104        | 67.3                  | *463              | 27            | 131          |
| 4285    | BH92                 | Prosper  | 6     | 33.3               | 71.4     | 51                    | 78.0             | 2.0        | 1            | 12.9               | 5.47             | 44.6    | 110        | 57.9                  | 306               | 27            | 131          |
| 4286    | BH93                 | Prosper  | 6     | 33.9               | 78.0     | 54                    | 80.2             | 2.3        | 1            | *11.2              | 5.29             | 47.9    | 90         | 55.4                  | 204               | 46            | 1            |
| 4287    | BH94                 | Prosper  | 6     | 33.6               | 68.6     | 52                    | 78.8             | 1.8        | 1            | 12.4               | 5.19             | 42.4    | 107        | 57.3                  | 226               | 40            | 14           |
| 4288    | BH95                 | Prosper  | 6     | 36.4               | 76.9     | 47                    | 78.1             | 2.0        | 1            | 13.3               | 5.47             | 42.0    | 99         | 55.0                  | 222               | 34            | 45           |
| 4289    | BH96                 | Prosper  | 6     | 33.4               | 71.8     | 50                    | 79.3             | 2.4        | 1            | 12.5               | 5.51             | 47.1    | 103        | 56.7                  | 167               | 37            | 27           |
| 4290    | BH97                 | Prosper  | 6     | 30.9               | 57.4     | 49                    | 79.4             | 2.1        | 1            | 12.3               | 5.58             | 48.4    | 124        | 57.6                  | 143               | 37            | 27           |
| 4291    | BH98                 | Prosper  | 6     | 33.2               | 80.2     | 51                    | 77.9             | 2.2        | 1            | 13.1               | 5.72             | 46.1    | 113        | 63.6                  | 335               | 20            | 266          |
| 4292    | MOREX                | Prosper  | 6     | 30.6               | 68.1     | 50                    | 80.2             | 2.4        | 1            | 13.4               | 6.63             | 50.6    | 133        | 70.4                  | 102               | 32            | 67           |
| 4293    | BH99                 | Prosper  | 6     | 33.2               | 69.5     | 55                    | 79.3             | 2.2        | 1            | 13.2               | 5.73             | 46.5    | 111        | 63.3                  | 255               | 25            | 173          |
| 4295    | BH100                | Prosper  | 6     | 32.9               | 72.0     | 54                    | 79.6             | 1.9        | 1            | 12.5               | 5.41             | 46.8    | 125        | 63.3                  | 280               | 33            | 59           |
| 4296    | BH101                | Prosper  | 6     | 32.3               | 67.6     | 54                    | 78.3             | n.d.       | 3            | 12.4               | 5.35             | 46.4    | 112        | 65.6                  | 374               | 22            | 222          |
| 4297    | BH102                | Prosper  | 6     | 32.3               | 75.2     | 53                    | 78.8             | 2.2        | 1            | 12.5               | 5.36             | 44.7    | 104        | 65.8                  | 381               | 32            | 67           |
| 4298    | BH103                | Prosper  | 6     | 34.4               | 81.5     | 55                    | 77.9             | 2.2        | 1            | 13.4               | 5.91             | 46.1    | 125        | 68.0                  | 336               | 20            | 266          |
| 4299    | BH104                | Prosper  | 6     | 32.8               | 76.8     | 52                    | 79.1             | n.d.       | 3            | 12.9               | 5.20             | 42.2    | 111        | 59.8                  | 156               | 39            | 21           |
| 4300    | HAZEN                | Prosper  | 6     | 32.9               | 82.7     | 51                    | 81.2             | 2.3        | 1            | 13.0               | 6.04             | 49.2    | 124        | 67.4                  | 124               | 34            | 45           |
| 4301    | FOSTER               | Prosper  | 6     | 32.8               | 81.6     | 46                    | 80.2             | 2.5        | 1            | 12.3               | 6.04             | 52.2    | 116        | 71.6                  | 200               | 35            | 38           |
| 4302    | BEACON               | Prosper  | 6     | 30.6               | 64.1     | 50                    | 79.2             | 2.5        | 2            | 13.7               | 6.10             | 45.8    | 144        | 62.7                  | 36                | 29            | 105          |
| 4303    | BH105                | Prosper  | 6     | 34.4               | 74.0     | 46                    | 78.1             | 2.5        | 1            | 12.2               | 5.89             | 49.3    | 120        | 63.7                  | 178               | 30            | 87           |
| 4304    | BH107                | Prosper  | 6     | 31.7               | 64.0     | 55                    | *72.8            | 1.8        | 1            | 12.3               | 4.79             | 40.4    | 99         | 58.8                  | 250               | 35            | 38           |
| 4305    | BH108                | Prosper  | 6     | 32.4               | 63.6     | 48                    | 78.6             | 2.0        | 1            | 12.6               | 5.19             | 42.4    | 87         | 57.4                  | 272               | 35            | 38           |
| 4306    | BH109                | Prosper  | 6     | 30.8               | 56.8     | 52                    | 78.9             | 2.2        | 1            | 12.4               | 5.51             | 47.8    | 114        | 63.8                  | 165               | 26            | 146          |

Table 59

| Lab No. | Variety or Selection | Location | Rowed | Kernel | on    | Barley | Malt    |            | Barley       | Wort    |             | S/T  | DP  | Alpha-  | Beta-           | Quality      | Overall |
|---------|----------------------|----------|-------|--------|-------|--------|---------|------------|--------------|---------|-------------|------|-----|---------|-----------------|--------------|---------|
|         |                      |          |       | Weight | 6/64" | Color  | Extract | Wort Color | Wort Clarity | Protein | Protein (%) |      |     | (°ASBC) | amylase (20°DU) | glucan (ppm) | Score   |
| 4307    | BH110                | Prosper  | 6     | 31.5   | 61.6  | 50     | 78.7    | 1.9        | 1            | 12.9    | 5.59        | 46.5 | 125 | 51.8    | 123             | 32           | 67      |
| 4308    | BH111                | Prosper  | 6     | 34.1   | 74.3  | 50     | 78.1    | 2.2        | 1            | 13.0    | 5.66        | 44.8 | 124 | 62.9    | 218             | 30           | 87      |
| 4309    | BH112                | Prosper  | 6     | 32.7   | 73.1  | 47     | 78.6    | 2.2        | 1            | 13.5    | 5.80        | 44.7 | 119 | 57.3    | 203             | 34           | 45      |
| 4310    | BH113                | Prosper  | 6     | 32.6   | 66.7  | 47     | 79.9    | 2.1        | 1            | 12.7    | 5.55        | 44.2 | 113 | 56.6    | 168             | 34           | 45      |
| 4311    | BH114                | Prosper  | 6     | 33.0   | 64.9  | 48     | 80.3    | 2.1        | 1            | 11.6    | 5.15        | 46.2 | 94  | 54.7    | 285             | 44           | 4       |
| 4312    | BH115                | Prosper  | 6     | 35.0   | 76.5  | 50     | 79.1    | 2.5        | 1            | 11.7    | 5.84        | 52.8 | 114 | 69.5    | 172             | 33           | 59      |
| 4313    | BH116                | Prosper  | 6     | 32.9   | 72.5  | 49     | 79.0    | 2.3        | 1            | 13.2    | 5.92        | 46.5 | 129 | 64.4    | 144             | 32           | 67      |
| 4314    | BH117                | Prosper  | 6     | 33.0   | 61.4  | 57     | 78.2    | 2.1        | 1            | 12.1    | 5.56        | 48.1 | 103 | 59.3    | 95              | 35           | 38      |
| 4315    | BH118                | Prosper  | 6     | 33.9   | 72.7  | 52     | 79.6    | 2.1        | 1            | 12.0    | 5.68        | 48.3 | 115 | 55.6    | 111             | 41           | 7       |
| 4317    | BH119                | Prosper  | 6     | 31.1   | 52.6  | 55     | 77.2    | 2.0        | 1            | 12.6    | 5.39        | 46.0 | 103 | 59.7    | 210             | 21           | 240     |
| 4318    | BH120                | Prosper  | 6     | 31.2   | 49.8  | 45     | 79.0    | 2.2        | 1            | 13.5    | 5.92        | 45.5 | 130 | 55.6    | 103             | 41           | 7       |
| 4319    | BH121                | Prosper  | 6     | 31.9   | 56.4  | 53     | 79.1    | 1.9        | 1            | 12.5    | 5.49        | 45.2 | 126 | 52.0    | 99              | 40           | 14      |
| 4320    | BH122                | Prosper  | 6     | 33.5   | 69.6  | 53     | 80.5    | 2.0        | 1            | 12.7    | 5.76        | 46.4 | 112 | 61.9    | 135             | 32           | 67      |
| 4321    | BH123                | Prosper  | 6     | 34.1   | 74.0  | 52     | 79.5    | 2.3        | 1            | 12.5    | 5.81        | 48.0 | 117 | 69.8    | 65              | 33           | 59      |
| 4322    | BH124                | Prosper  | 6     | 33.8   | 62.4  | 50     | 79.4    | 2.2        | 1            | 12.9    | 5.93        | 48.7 | 142 | 65.1    | 84              | 36           | 34      |
| 4323    | BH125                | Prosper  | 6     | 33.0   | 80.5  | 48     | 78.3    | 2.0        | 1            | 13.4    | 5.70        | 43.6 | 136 | 65.0    | 190             | 36           | 34      |
| 4324    | BH126                | Prosper  | 6     | 36.2   | 85.5  | 40     | 79.6    | 2.1        | 1            | 13.0    | 5.93        | 47.0 | 115 | 61.7    | 127             | 34           | 45      |
| 4325    | BH127                | Prosper  | 6     | 30.7   | 59.9  | 45     | 76.9    | 2.3        | 1            | 14.1    | 6.14        | 43.7 | 160 | 64.1    | 87              | 25           | 173     |
| 4326    | BH128                | Prosper  | 6     | 32.9   | 63.7  | 39     | *73.7   | 2.5        | 1            | 13.7    | 6.31        | 47.9 | 144 | 59.1    | 56              | 26           | 146     |
| 4327    | BH129                | Prosper  | 6     | 33.2   | 74.1  | 48     | 78.9    | 2.0        | 1            | 12.6    | 5.60        | 44.4 | 115 | 59.8    | 167             | 37           | 27      |
| 4328    | BH130                | Prosper  | 6     | 31.9   | 71.9  | 49     | 77.5    | 2.1        | 1            | 14.4    | 6.26        | 44.2 | 150 | 71.5    | 143             | 28           | 118     |
| 4329    | BH132                | Prosper  | 6     | 33.9   | 63.6  | 48     | 79.0    | 2.0        | 1            | 13.6    | 5.90        | 44.6 | 133 | 55.4    | 166             | 38           | 23      |
| 4330    | BH133                | Prosper  | 6     | 35.9   | 71.0  | 51     | 79.2    | 2.0        | 1            | 12.6    | 5.50        | 45.8 | 125 | 55.9    | 226             | 37           | 27      |
| 4331    | BH134                | Prosper  | 6     | 34.9   | 68.0  | 46     | 78.2    | 2.0        | 1            | 13.5    | 5.46        | 42.7 | 130 | 56.3    | 289             | 31           | 80      |
| 4332    | BH135                | Prosper  | 6     | 32.5   | 61.5  | 53     | 77.4    | 2.2        | 1            | 14.3    | 6.24        | 46.3 | 161 | 66.3    | 62              | 14           | 339     |
| 4333    | BH136                | Prosper  | 6     | 31.4   | 61.5  | 47     | 77.4    | 2.1        | 1            | 13.1    | 5.84        | 47.2 | 120 | 65.9    | 243             | 17           | 313     |
| 4334    | BH137                | Prosper  | 6     | 32.6   | 66.6  | 57     | 78.8    | 2.1        | 1            | 11.5    | 5.65        | 52.2 | 100 | 64.2    | 152             | 27           | 131     |
| 4335    | BH138                | Prosper  | 6     | 32.5   | 61.0  | 50     | 77.8    | 2.0        | 1            | 13.3    | 5.65        | 45.0 | 107 | 60.1    | 252             | 23           | 208     |
| 4336    | BH139                | Prosper  | 6     | 31.8   | 61.2  | 53     | 78.8    | 2.0        | 1            | 12.6    | 5.59        | 45.4 | 141 | 54.2    | 62              | 40           | 14      |
| 4337    | BH140                | Prosper  | 6     | 34.2   | 71.9  | 42     | 76.8    | 2.4        | 1            | 14.0    | 6.17        | 46.3 | 150 | 66.2    | 134             | 29           | 105     |

Table 59

| Lab No. | Variety or Selection | Location | Rowed | Kernel Weight (mg) | on 6/64" | Barley Color (Agtron) | Malt Extract (%) | Wort Color | Wort Clarity | Barley Protein (%) | Wort Protein (%) | S/T (%) | DP (°ASBC) | Alpha-amylase (20°DU) | Beta-glucan (ppm) | Quality Score | Overall Rank |
|---------|----------------------|----------|-------|--------------------|----------|-----------------------|------------------|------------|--------------|--------------------|------------------|---------|------------|-----------------------|-------------------|---------------|--------------|
| 4338    | BH141                | Prosper  | 6     | 34.7               | 65.7     | 49                    | 77.6             | 2.4        | 1            | 12.6               | 5.82             | 47.5    | 120        | 59.6                  | 87                | 26            | 146          |
| 4339    | BH142                | Prosper  | 6     | 33.8               | 75.1     | 50                    | 78.9             | 2.1        | 1            | 12.0               | 5.78             | 49.0    | 110        | 62.7                  | 120               | 34            | 45           |
| 4340    | HAZEN                | Prosper  | 6     | 33.4               | 82.3     | 53                    | 80.2             | 2.1        | 1            | 13.2               | 5.89             | 45.2    | 133        | 72.9                  | 153               | 42            | 5            |
| 4341    | BH143                | Prosper  | 6     | 33.4               | 78.5     | 50                    | 79.5             | 2.1        | 1            | 12.5               | 5.32             | 44.8    | 109        | 60.2                  | 188               | 40            | 14           |
| 4342    | BH144                | Prosper  | 6     | 31.0               | 64.5     | 50                    | 78.5             | 2.0        | 1            | 12.3               | 5.18             | 43.0    | 106        | 50.1                  | 85                | 46            | 1            |
| 4343    | BH145                | Prosper  | 6     | 31.7               | 55.5     | 54                    | 77.4             | 2.1        | 1            | 13.3               | 5.47             | 41.8    | 127        | 59.8                  | 146               | 30            | 87           |
| 4345    | BH146                | Prosper  | 6     | 32.4               | 65.2     | 53                    | 77.5             | 2.2        | 1            | 12.7               | 5.40             | 45.8    | 97         | 57.8                  | 197               | 27            | 131          |
| 4346    | FOSTER               | Prosper  | 6     | 33.7               | 79.3     | 47                    | 79.5             | 2.5        | 1            | 12.8               | 5.96             | 48.0    | 112        | 69.0                  | 166               | 30            | 87           |
| 4347    | BH148                | Prosper  | 6     | 31.8               | 66.7     | 50                    | 77.6             | 2.1        | 1            | 12.7               | 5.22             | 42.7    | 134        | 50.3                  | 123               | 41            | 7            |
| 4348    | MOREX                | Prosper  | 6     | 29.4               | 64.1     | 46                    | 78.9             | 2.4        | 1            | 14.5               | 6.45             | 47.6    | 138        | 67.4                  | 73                | 18            | 303          |
| 4349    | MOREX                | Prosper  | 6     | 29.0               | 59.2     | 51                    | 79.2             | 2.5        | 1            | 14.4               | 6.57             | 46.6    | 141        | 75.0                  | 74                | 21            | 240          |
| 4350    | BH151                | Prosper  | 6     | 30.3               | 48.2     | 49                    | 78.3             | 2.2        | 1            | 12.6               | 5.43             | 44.6    | 144        | 51.1                  | 33                | 37            | 27           |
| 4351    | BEACON               | Prosper  | 6     | 30.2               | 64.5     | 49                    | 78.1             | 2.1        | 1            | 14.8               | 6.10             | 42.2    | 147        | 60.0                  | 34                | 22            | 222          |
| 4352    | BH152                | Prosper  | 6     | 32.0               | 63.4     | 41                    | 78.6             | 2.4        | 1            | 13.0               | 5.72             | 46.8    | 110        | 60.3                  | 95                | 26            | 146          |
| 4353    | BH154                | Prosper  | 6     | 33.9               | 73.8     | 46                    | 78.7             | 2.1        | 1            | 13.1               | 5.60             | 45.5    | 144        | 65.8                  | 147               | 41            | 7            |
| 4354    | BH155                | Prosper  | 6     | 31.7               | 64.5     | 51                    | 77.6             | 2.0        | 1            | 13.2               | 5.01             | 39.9    | 84         | 52.1                  | 236               | 28            | 118          |
| 4355    | BH156                | Prosper  | 6     | 31.9               | 58.6     | 52                    | 78.2             | 2.0        | 1            | 13.4               | 5.68             | 44.3    | 115        | 55.8                  | 69                | 30            | 87           |
| 4356    | BH157                | Prosper  | 6     | 32.4               | 67.4     | 46                    | 79.0             | 1.9        | 1            | 13.0               | 5.11             | 42.1    | 110        | 52.2                  | 179               | 41            | 7            |
| 4357    | BH158                | Prosper  | 6     | 33.3               | 70.7     | 44                    | 77.8             | 2.3        | 1            | 14.0               | 5.82             | 43.8    | 103        | 63.6                  | 172               | 21            | 240          |
| 4358    | BH159                | Prosper  | 6     | 33.3               | 67.5     | 45                    | 78.2             | 2.3        | 1            | 13.1               | 5.62             | 44.7    | 132        | 61.2                  | 143               | 35            | 38           |
| 4359    | BH160                | Prosper  | 6     | 32.7               | 67.5     | *72                   | 79.3             | 2.2        | 1            | 12.5               | 5.52             | 46.8    | 123        | 56.1                  | 149               | 38            | 23           |
| 4361    | BH161                | Prosper  | 6     | 31.2               | 64.8     | 53                    | 78.9             | 2.1        | 1            | 13.1               | 5.67             | 43.9    | 135        | 61.0                  | 154               | 30            | 87           |
| 4362    | BH162                | Prosper  | 6     | 33.9               | 76.8     | 48                    | 78.1             | 2.0        | 1            | 13.1               | 5.58             | 44.2    | 116        | 64.6                  | 198               | 30            | 87           |
| 4363    | BH163                | Prosper  | 6     | 34.0               | 76.9     | 44                    | 78.2             | 2.0        | 1            | 13.3               | 5.54             | 42.3    | 133        | 64.0                  | 313               | 31            | 80           |
| 4364    | BH164                | Prosper  | 6     | 30.7               | 67.0     | 52                    | 78.8             | 2.0        | 1            | 13.6               | 5.72             | 44.0    | 122        | 62.6                  | 180               | 26            | 146          |
| 4365    | BH165                | Prosper  | 6     | 31.3               | 50.0     | 47                    | 77.5             | 2.0        | 1            | 13.8               | 5.40             | 39.5    | 133        | 53.0                  | 116               | 32            | 67           |
| 4366    | BH166                | Prosper  | 6     | 32.5               | 76.0     | 48                    | 79.4             | 1.9        | 1            | 13.3               | 5.56             | 42.9    | 109        | 60.6                  | 286               | 33            | 59           |
| 4367    | BH167                | Prosper  | 6     | 35.4               | 73.6     | 38                    | 77.4             | 2.0        | 1            | 14.9               | 5.40             | *37.8   | 99         | 59.9                  | 306               | 17            | 313          |
| 4368    | BH168                | Prosper  | 6     | 29.8               | 63.9     | 44                    | 77.6             | 2.3        | 1            | *15.5              | 6.58             | 43.1    | 155        | 64.5                  | 27                | 16            | 326          |
| 4369    | BH169                | Prosper  | 6     | 32.5               | 75.8     | 40                    | 78.2             | 2.2        | 1            | 14.5               | 6.15             | 43.7    | 143        | 68.2                  | 206               | 29            | 105          |

Table 59

| Lab No.                   | Variety or Selection | Location | Rowed | Kernel Weight (mg) | on 6/64" | Barley Color (Agtron) | Malt Extract (%) | Wort Color | Wort Clarity | Barley Protein (%) | Wort Protein (%) | S/T (%) | DP (°ASBC) | Alpha-amylase (20°DU) | Beta-glucan (ppm) | Quality Score | Overall Rank |
|---------------------------|----------------------|----------|-------|--------------------|----------|-----------------------|------------------|------------|--------------|--------------------|------------------|---------|------------|-----------------------|-------------------|---------------|--------------|
| 4370                      | BH170                | Prosper  | 6     | 33.8               | 74.0     | 44                    | 77.3             | 2.3        | 1            | 14.8               | 6.03             | 43.7    | 131        | 65.0                  | 130               | 26            | 146          |
| 4371                      | BH171                | Prosper  | 6     | 29.0               | 60.1     | 47                    | 79.3             | 2.5        | 1            | 14.2               | 6.68             | 49.9    | 132        | 76.5                  | 75                | 18            | 303          |
| 4006                      | MOREX MALT CHECK     |          | 6     | 30.6               | 70.2     | 70                    | 80.0             | 2.0        | 1            | 12.4               | 5.93             | 48.4    | 136        | 74.8                  | 50                | 36            |              |
| 4025                      | MOREX MALT CHECK     |          | 6     | 31.0               | 73.1     | 71                    | 79.9             | 1.8        | 1            | 12.0               | 6.13             | 53.4    | 123        | 75.4                  | 74                | 29            |              |
| 4046                      | MOREX MALT CHECK     |          | 6     | 31.0               | 71.1     | 72                    | 79.8             | 1.8        | 1            | 11.9               | 6.13             | 53.2    | 133        | 74.6                  | 53                | 33            |              |
| 4065                      | MOREX MALT CHECK     |          | 6     | 30.2               | 71.4     | 71                    | 79.1             | 1.9        | 1            | 11.9               | 5.72             | 49.9    | 137        | 73.7                  | 60                | 36            |              |
| 4085                      | MOREX MALT CHECK     |          | 6     | 30.8               | 69.3     | 72                    | 79.0             | 1.9        | 1            | 12.6               | 6.30             | 52.6    | 123        | 69.8                  | 92                | 25            |              |
| 4106                      | MOREX MALT CHECK     |          | 6     | 30.5               | 70.9     | 73                    | 79.9             | 2.0        | 1            | 12.4               | 6.24             | 53.0    | 122        | 73.2                  | 80                | 29            |              |
| 4129                      | MOREX MALT CHECK     |          | 6     | 30.4               | 66.0     | 76                    | 78.0             | 1.9        | 1            | 12.5               | 5.98             | 47.7    | 129        | 71.2                  | 126               | 25            |              |
| 4149                      | MOREX MALT CHECK     |          | 6     | 31.0               | 71.9     | 75                    | 79.1             | 1.8        | 1            | 12.2               | 5.95             | 52.8    | 120        | 77.3                  | 79                | 32            |              |
| 4171                      | MOREX MALT CHECK     |          | 6     | 30.7               | 71.4     | 70                    | 80.2             | 1.9        | 1            | 12.5               | 6.24             | 53.1    | 124        | 68.5                  | 85                | 31            |              |
| 4191                      | MOREX MALT CHECK     |          | 6     | 30.4               | 70.2     | 72                    | 79.7             | 1.9        | 1            | 12.7               | 6.20             | 51.7    | 118        | 69.5                  | 80                | 24            |              |
| 4212                      | MOREX MALT CHECK     |          | 6     | 31.5               | 70.4     | 70                    | 80.1             | 1.9        | 1            | 12.3               | 6.32             | 55.3    | 121        | 75.2                  | 58                | 32            |              |
| 4232                      | MOREX MALT CHECK     |          | 6     | 31.8               | 70.9     | 70                    | 80.0             | 2.0        | 1            | 12.5               | 6.29             | 51.5    | 133        | 76.4                  | 52                | 33            |              |
| 4253                      | MOREX MALT CHECK     |          | 6     | 31.7               | 72.6     | 70                    | 79.9             | 2.0        | 1            | 12.3               | 6.17             | 51.9    | 128        | 78.1                  | 62                | 29            |              |
| 4274                      | MOREX MALT CHECK     |          | 6     | 31.6               | 72.5     | 69                    | 80.6             | 2.0        | 1            | 12.5               | 6.28             | 51.3    | 116        | 70.9                  | 40                | 24            |              |
| 4294                      | MOREX MALT CHECK     |          | 6     | 31.3               | 73.3     | 72                    | 80.2             | 2.0        | 1            | 12.5               | 6.19             | 51.7    | 121        | 81.2                  | 87                | 31            |              |
| 4316                      | MOREX MALT CHECK     |          | 6     | 31.6               | 71.3     | 75                    | 80.1             | 2.0        | 1            | 12.2               | 6.39             | 54.2    | 123        | 73.1                  | 55                | 32            |              |
| 4344                      | MOREX MALT CHECK     |          | 6     | 31.1               | 70.9     | 71                    | 79.3             | 2.2        | 1            | 12.4               | 5.96             | 50.9    | 125        | 77.0                  | 64                | 32            |              |
| 4360                      | MOREX MALT CHECK     |          | 6     | 31.2               | 71.6     | 67                    | 79.3             | 2.0        | 1            | 12.4               | 5.86             | 48.8    | 112        | 75.2                  | 62                | 32            |              |
| Minima                    |                      |          |       | 25.1               | 12.6     | 35                    | 72.8             | 1.7        |              | 11.5               | 4.79             | 39.5    | 84         | 50.1                  | 20                | 5             |              |
| Maxima                    |                      |          |       | 36.4               | 87.9     | 71                    | 81.2             | 2.8        |              | 15.3               | 7.03             | 53.2    | 175        | 86.1                  | 396               | 46            |              |
| Means                     |                      |          |       | 30.3               | 50.0     | 53                    | 76.9             | 2.1        |              | 13.4               | 5.84             | 45.4    | 131        | 65.9                  | 164               | 25            |              |
| Standard Deviations       |                      |          |       | 2.6                | 19.5     | 7                     | 1.9              | 0.2        |              | 0.7                | 0.40             | 2.5     | 18         | 7.2                   | 78                | 8             |              |
| Coefficients of Variation |                      |          |       | 8.5                | 39.0     | 13                    | 2.5              | 9.8        |              | 5.1                | 6.84             | 5.4     | 13         | 10.9                  | 48                | 30            |              |

Malt Check Data are Excluded from Rank Sorting and Statistics

Table Data Flagged by an Asterisk Exceed the Mean by +/- 3 Standard Deviations and are Excluded from Statistics

For Wort Clarity - 1 = clear, 2 = slightly hazy, 3 = hazy; Wort Colors were not determined (n.d.) on hazy samples

Samples Submitted by R.D. Horsley and J.D. Franckowiak, North Dakota State University - Fargo

# **Appendix A: METHODS**

**Cleaning** All samples were cleaned on a Carter Dockage Tester and any material not retained on a 5/64" screen was discarded.

**Barley Mill** Ground barley was prepared with a Labconco Burr mill that was adjusted so that only 35% of the grist remained on a 525 µm sieve after 3 min of shaking and tapping.

**Kernel Weight** The number of kernels in a 20 g aliquot of each sample was counted electronically and the '1000 kernel weight' was calculated.

**Plumpness** Samples were sized on a Eureka-Niagra Barley Grader and the percentage of the seeds retained on a 6/64" screen was determined.

**Barley Color** The brightness of the grains was measured using an Agtron M31A analyzer.

**Barley Moisture Content** Five g of ground sample was dried for 3 h at 106°C. The percentage of weight loss that occurred during this drying was calculated.

**Barley Protein Content** Total nitrogen values were obtained using an automated Dumas combustion procedure with a LECO FP-528 analyzer. Nitrogen values were converted to protein percentages by multiplication by 6.25.

**Malting Conditions** 170 g (db) barley samples were steeped at 16°C for 32-48 h, to 45% moisture, by alternating 4 h of wet steep with 4 h of air rest. The steeped samples were placed in a chamber for 5 d at 17°C and near 100% R.H., in cans that were rotated for 3.0 min every 30 min. The germinated grain (green malt) was kilned for 24 h as follows: 0.5 h from 25°C to 49°C, 9.5 h at 49°C, 0.5 h from 49°C to 54°C, 4.0 h at 54°C, 0.5 h from 54°C to 60°C, 3.0 h at 60°C, 0.5 h from 60°C to 68°C, 2.0 h at 68°C, 0.5h from 68°C to 85°C, and 3.0 h at 85°C.

**Malt Mill** Fine-grind malts were prepared with a Miag laboratory cone mill that was adjusted so that 10% of the grist remained on a 525 µm sieve after 3 min of shaking, with tapping. Coarse-grind malts were prepared with a corrugated roll mill that was adjusted so that 75% of the grist remained on a 525 µm sieve. Ground malts for moisture, protein and amyloytic activity analyses were ground in a Labconco Burr mill (see Barley Mill).

**Malt Moisture Content** See Barley Moisture Content.

**Malt Protein Content** See Barley Protein Content.

**Malt Extract** The finely ground samples were extracted using the Malt-4 procedure (Methods of Analysis of the ASBC, 8th Ed., 1992), except that all weights and volumes specified for the method were halved. The specific gravity of the filtrate was measured with an Anton/Parr DMA5000 density meter. The density data were used to calculate the amount of soluble material present in the filtrate, and thus the percentage that was extracted from the malt.

**Wort Color** was determined on a Skalar SAN plus analyzer by subtracting the absorbance at 700 nm from that at 430 nm and dividing by a factor that was determined by comparison with values obtained in a collaborative test.

**Wort Clarity** was assessed by visual inspection.

**b-Glucan Levels** were determined on a Skalar SAN plus analyzer by using the Wort-18 fluorescence flow injection analysis method with calcofluor as the fluorescent agent (Methods of Analysis of the ASBC, 8th Ed., 1992).

**Soluble (Wort) Protein Levels** were determined on a Skalar SAN plus analyzer using the Wort-17 UV-spectrophotometric method (Methods of Analysis of the ASBC, 8th Ed., 1992).

**S/T Ratio** was calculated as Soluble Protein / Total Malt Protein

**Diastatic Power Values** were determined on a Skalar SAN plus analyzer by the automated ferricyanide procedure Malt-6A (Methods of Analysis of the ASBC, 8th Ed., 1992).

**a-Amylase activities** were measured on a Skalar SAN plus analyzer by heating the extract to 73°C to inactivate any β-amylase present. The remaining (α-amylase) activity was measured as described for Diastatic Power Values.

**Quality Scores** were calculated by using a modification of the method of Clancy and Ullrich (Cereal Chem. 65:428-430, 1988). The criteria used to quantify individual quality factors are listed in Table A1.

**Overall Rank Values** were ordered from low to high based on their Quality Scores. A rank of '1' was assigned to the sample with the best quality score.

**Quality Score Parameters for 2- and 6-rowed barleys**

| Quality parameter                                    | 2-rowed     |       | 6-rowed     |       |
|--|-------------|-------|-------------|-------|
|  | condition   | score | condition   | score |
| Kernel Weight<br>(mg)                                | > 42.0      | 5     | > 32.0      | 5     |
|  | 40.1–42.0   | 4     | 30.1–32.0   | 4     |
|  | 38.1–40.0   | 2     | 28.1–30.0   | 2     |
|  | ≤ 38.0      | 0     | ≤ 28.0      | 0     |
| on 6/64 "<br>(%)                                     | ≥ 90.0      | 5     | ≥ 77.0      | 5     |
|  | 85.0–89.9   | 3     | 70.0–76.9   | 3     |
|  | < 85.0      | 0     | < 70.0      | 0     |
| Malt Extract<br>(% db)                               | ≥ 81.0      | 10    | ≥ 80.0      | 10    |
|  | 79.5–80.9   | 7     | 79.0–79.9   | 7     |
|  | 78.0–79.4   | 4     | 78.0–78.9   | 4     |
|  | < 78.0      | 0     | < 78.0      | 0     |
| Wort Clarity<br>3=hazy<br>2=slightly hazy<br>1=clear | = 3         | 0     | = 3         | 0     |
|  | = 2         | 1     | = 2         | 1     |
|  | = 1         | 2     | = 1         | 2     |
|  | 1=clear     |       |             |       |
| Barley Protein<br>(% db)                             | ≥ 13.5      | 0     | ≥ 14.0      | 0     |
|  | 12.6–13.4   | 5     | 12.6–13.9   | 5     |
|  | 10.1–12.5   | 10    | 10.6–12.5   | 10    |
|  | ≤ 10.0      | 5     | ≤ 10.5      | 5     |
| Wort Protein<br>(% db)                               | > 6.0       | 0     | > 6.0       | 0     |
|  | 5.1–6.0     | 3     | 5.3–6.0     | 3     |
|  | 4.4–5.0     | 7     | 4.6–5.2     | 7     |
|  | < 4.4       | 0     | < 4.6       | 0     |
| S/T (Soluble/Total<br>Protein, % db)                 | > 46.0      | 0     | > 46.0      | 0     |
|  | 40.0–46.0   | 5     | 40.0–46.0   | 5     |
|  | < 40.0      | 0     | < 40.0      | 0     |
| DP (Diastatic<br>Power, ° ASBC)                      | > 140.0     | 0     | > 170.0     | 0     |
|  | 130.1–140.0 | 4     | 160.1–170.0 | 4     |
|  | 110.0–130.0 | 7     | 140.0–160.0 | 7     |
|  | 95.0–109.9  | 4     | 130.0–139.9 | 4     |
|  | < 95.0      | 0     | < 130.0     | 0     |
| Alpha-amylase<br>(20° DU)                            | > 55.0      | 0     | > 60.0      | 0     |
|  | 50.1–55.0   | 4     | 55.1–60.0   | 4     |
|  | 40.0–50.0   | 7     | 45.0–55.0   | 7     |
|  | 35.0–39.9   | 4     | 40.0–44.9   | 4     |
|  | < 35.0      | 0     | < 40.0      | 0     |
| Beta-glucan<br>(ppm)                                 | < 40        | 0     | < 40        | 0     |
|  | 40–80       | 3     | 40–80       | 3     |
|  | 80 – 150    | 7     | 80 – 150    | 7     |
|  | 150 – 300   | 3     | 150 – 300   | 3     |
|  | > 300       | 0     | > 300       | 0     |